Z. 34. 6

'S LANDS PLANTENTUIN
(INSTITUTS SCIENTIFIQUES DE BUITENZORG)

LB B1158

TREUBIA

BIJDRAGEN OVER ZOÖLOGIE, HYDROBIOLOGIE EN OCEANOGRAPHIE VAN DEN OOST-INDISCHEN ARCHIPEL

ONDER REDACTIE VAN

Dr. K. W. DAMMERMAN
Hoofd van het Zoölogisch Museum en Laboratorium te Buitenzorg (Java.)

DEEL 15

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INHOUD

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ON SOME MAMMALS FROM THE KARIMATA ISLANDS AND DUTCH WEST BORNEO

by

F. N. CHASEN, C.M.Z.S.

(Director, Raffles Museum, Singapore).

I am indebted to Dr. K. W. DAMMERMAN of the Zoological Museum, Buitenzorg, Java, for the privilege of examining two small collections of mammals made in 1931 by Mr. L. COOMANS DE RUITER and the Zoological Museum, in the low country at and near Pontianak on the west coast of Borneo, and in the Karimata Islands lying off the west coast of the island.

The collection from Pontianak made in March and April contains no novelties, or even rare species, but in view of the preliminary studies made by Mr. C. BODEN KLOSS and myself in the exact distribution of mammals in Borneo [1]), I was very glad to have the opportunity of examining the collection for it provides answers to several hitherto open questions concerning the distribution of some subspecies of mammals. Other collectors of mammals have, of course, worked in the well-known neighbourhood of Pontianak. The most recent collection seems to be that made by Dr. W. L. ABBOTT in 1905 and reported on by MARCUS WARD LYON [2]).

The small collection from the Karimata Islands by no means includes examples of all the species known from the islands and with the exception of extending the range of the common longtailed macaque to Pelapis and Seroetoe adds nothing to our knowledge of the distribution of species within the island group. The acquisition, however, of the fresh specimens does provide an opportunity of reviewing some of the peculiar forms of Karimata mammals hitherto only known from the collections made by Dr. W. L. ABBOTT in 1904, 1907, and 1908. These were studied and reported on by MILLER [3]) and LYON [4]).

The present collection contains material from the following islands.—

Panebangan (Penebangan, Panembangan) is only ten miles from Poeloe Maja which may be considered as forming part of the mainland of Borneo as it is only insulated by the Maja River (19th-20th, 28th March).

[1]) *vide* "On a collection of Mammals from the Lowlands and Islands of North Borneo", by F. N. CHASEN and C. BODEN KLOSS, Bull. Raffles Museum, 6, 1931, pp. 1-82.

[2]) "Mammals collected in Western Borneo by Dr. W. L. Abbott", by MARCUS WARD LYON, Jr., Proc. U. S. Nat. Mus., XXXIII, 1907, pp. 547-572.

[3]) "Mammals collected by Dr. W. L. Abbott in the Karimata Islands, Dutch East Indies", by GERRIT S. MILLER, Jr., Proc. U. S. Nat. Mus., XXXI, 1906, pp. 55-66.

[4]) "Mammals collected by Dr. W. L. Abbott on Borneo and some of the small adjacent islands", by MARCUS WARD LYON, Jr., *op. cit.*, 40, 1911, pp. 53-146.

Pelapis (Pelapi) is one of the islands of a small group south-west of Panebangan (20-21st March).

Karimata Besar (Karimata Island; Carimata) about thirty miles from the nearest point of the mainland (Poeloe Maja). This is much the largest island of the group: it measures approximately eleven by seven miles (23rd-26th March).

Seroetoe (Serutu) is a few miles south-west of Karimata Besar (24-25th March).

Panebangan is within the five fathom line: the ten fathom line embraces the Pelapis Islands. Between the latter and Karimata Island a depth of twenty-five fathoms is recorded. It is noteworthy that in the narrow strait, about four miles across, between Karimata and Seroetoe there is a depth of twenty-three fathoms.

Pygathrix rubicunda ignita (DOLLMAN).

Presbytis ignitus DOLLMAN, Ann. Mag. Nat. Hist. (8) 4, 1909, p. 204 ("Mount Mulu, Baram, Sarawak").

Simpang, West Borneo, 1 ♀.

On locality this specimen could be expected to be referable to *P. r. rubida* LYON [5]) described from Batoe Joerong, South-western Borneo, but its skull does not show the peculiarities assigned to that subspecies. In general colour the skin is exactly like others in a similar condition from Sarawak and North Borneo, but the hands and feet are merely sprinkled with black, therein, as could be expected, resembling *ignita* from the former territory.

In the Raffles Museum there is an adult of *P. r. carimatae* MILLER, collected on Karimata Island by Dr. W. L. ABBOTT in 1908. Although in good coat it is pale and very bright, the hands and feet are sprinkled with black hairs but the tail is unsullied. In colour this skin cannot be exactly matched from a good series of the species from Sarawak and North Borneo.

Macaca irus subsp.

Seroetoe, 1 ♂; Pelapis, 1 ♀ juv.

ELLIOT described a macaque from Karimata Island as *Pithecus carimatae* [6]) summarizing its characters as follows. "This is a very large Macaque with a very long tail, and of a general grayish brown colour. It does not closely resemble any known species." This description is certainly not applicable to the Seroetoe adult listed above which in size, colour and general conformation of skull can be matched by other examples of the species from Sumatra, the Malay Peninsula and Borneo. It is a rather dull animal, comparatively grey on the limbs, well blackened on the tail and with the black line on the forehead relatively conspicuous.

The skull measures. — basal length, 77.9; zygomatic width, 76.3; maxillary tooth-row (alveoli), 36.3 mm.

[5]) Proc. U. S. Nat. Mus., 40, 1911, p. 139.
[6]) Proc. U. S. Nat. Mus., 38, 1910, p. 346.

Felis bengalensis undata DESMAREST.

Pematang Toedjoeh, Pontianak, 1 ♀ kitten.

Arctogalidia trivirgata stigmatica (TEMM.).

Peniti, Pontianak, 1 ♀.

Skull. — condylo-basal length, 96; zygomatic width, 57.9; maxillary tooth-row (alveoli), 35.5 mm.

The condylo-basal length of the skull of a large male from Sarawak is 107 mm; of a female, 103 mm. A few Sarawak specimens have the dorsal stripes scarcely distinguishable, therein differing strongly from the boldly marked *A. t. major* MILLER, occurring in the Malay States, which is also much larger, male skulls in the Raffles Museum running up to 113 mm in condylo-basal length and 73.5 mm in zygomatic width.

Tragulus kanchil carimatae MILLER.

Tragulus carimatae MILLER, Proc. U. S. Nat. Mus., XXXI, 1906, p. 55 ("Karimata Island").

Panebangan, 1 ♀ juv.

Although very young this specimen shows the racial character of a very dark back which is darker than in any example of *T. kanchil* examined from the mainland of Borneo. To this subspecies LYON has already referred adult mouse-deer from Panebangan.

Tragulus kanchil hosei BONHOTE.

Tragulus kanchil Hosei BONHOTE, Ann. Mag. Nat. Hist. (7) XI 1903, p. 293 (Baram River, Sarawak).

Tragulus hosei, LYON, Proc. U. S. Nat. Mus., 40, 1907, p. 549 (West Borneo).

Tragulus kanchil longipes, LYON, op. cit., 40, 1911, p. 66 (West, South-west and South-east Borneo).

Pematang Toedjoeh, Pontianak, 1 ♂.

The nape stripe is well defined. The hind-foot including the hoof, measures about 137 mm. Although there is only one skin of this species in the collection from Pontianak it is especially interesting in view of the fact that LYON, whose material of *hosei* was inadequate at the time, referred specimens from the Kapoeas and Simpang Rivers in Western Borneo to *T. k. longipes* of Eastern Sumatra whereas I cannot separate the Pontianak example from topotypes of *hosei* from Sarawak, including one from the actual type locality.

Ratufa affinis cothurnata LYON.

Ratufa cothurnata LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 93 ("foot of Mount Palung, near Sukadana, Western Borneo").

Peniti, Pontianak, 3 ♂, 3 ♀; Pematang Toedjoeh, Pontianak, 1 ♂.

This is a most instructive series: it is from localities close enough to the type locality of *cothurnata* to be regarded as fairly representing that form. The range of the subspecies extends to Samarahan in South Sarawak whence a series of skins presents about the same range of variation as does that from Pontianak: also individuals from the two districts can be matched.

Ratufa affinis griseicollis LYON.

Ratufa griseicollis LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 94 ("Panebangan Island").

Panebangan, 1 ♀.

This is a remarkably distinct form of *Ratufa affinis* and although in general appearance it is nearest to *cothurnata* of the opposite Bornean mainland it differs from any Bornean skin before me in its general richness of colour, especially in the rufous of the flanks and in the deep reddish buff of the under parts. It is especially distinctive on account of the cream-coloured sides of the head and neck: on the former region it is finely sprinkled with black.

Skull. — greatest length, 61.1; condylo-basilar length, 55; zygomatic breadth, 40.5; upper molar row (alveoli), 12.6 mm.

Sciurus prevosti carimatae MILLER.

Sciurus carimatae MILLER, Proc. U. S. Nat. Mus., 31, 1906, p. 57 ("Karimata Island").

Karimata, 4 ♂, 2 ♀.

Sciurus prevosti armalis LYON.

Sciurus armalis LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 82 ("Pulo Panebangan").

Panebangan, 4 ♂, 3 ♀.

Both this and the preceding subspecies have been described in detail in the original descriptions. *S. p. carimatae* much more closely resembles certain forms from the Malay States, Sumatra, the Riau Archipelago, and Banka Island than any form from the mainland of Borneo. In colour it is very like *S. p. wrayi* of the Malay Peninsula, and *S. p. carimonensis* of Karimon Island, but it is paler on the red areas, and the sides of the head are greyer than in the former, and less blackened than in the latter race. *S. p. armalis* is readily separable from *carimatae* on account of its greyish, not buff, shoulder patches but the feet of *armalis* are not invariably lighter.

Skull measurements of *Sciurus prevosti* subspp.

Name	Sex	Locality	Greatest length	Condylo-basilar length	Zygomatic breadth	Length of nasal	Maxillary tooth-row (alveoli)
S. p. carimatae	♂	Karimata	53.2	—	32	17.2	10.2
"	♂	"	54.5	46	—	16.2	10.2
"	♀	"	54.5	47.2	33.7	15.7	10.4
S. p. armalis	♂	Panebangan	53.1	—	31.8	15.3	9.8
"	♂	"	52.5	44.3	32	15.2	9.6
"	♀	"	51.8	43.7	31	15.3	10.6
C. p. borneoensis	♀	Near Pontianak	57.8	50.3	35.6	17.3	11
"	♀	"	56.5	50.3	34	17.6	10.7
"	♀	"	56.7	49.3	36.2	17.6	10.7

Sciurus prevosti borneoensis (MÜLLER and SCHLEGEL).

Peniti (near the coast a few miles north of Pontianak and between that place and Mampawah), 1 ♂, 3 ♀; Pematang Toedjoeh, (an estate in the neighbourhood of Soengai Kakap, south-west of Pontianak), 2 ♀.

In Central West Borneo *Sciurus prevosti* is even more variable than usual and at least three races are found near Pontianak. With the black-tailed *sanggaus* we are not concerned: it occurs south of the Kapoeas River. Immediately north of the Kapoeas two other forms are found. In the low, marshy country near the mouth is the very distinct *palustris* with blackish shoulders and under parts. Further inland, Dr. W. L. ABBOTT collected *borneoensis* at Sanggau and Tajan on the north bank, and also at Tandjoeng Poetoes, and above that place, on the Landak River. The present specimens extend the range of *borneoensis* to the coast and restrict that of *palustris*.

The skins from Peniti have the sides of the head and neck reddish or grizzled, but in those from Pematang Toedjoeh these parts are blackish. These latter specimens agree with the plate of *borneoensis* [1]), and judging by the description published by LYON [2]), also with the types, but the feet are blackish and not red. Variation within the subspecies has been discussed in detail by LYON. All the skins before me have a broad grizzled band along the flanks between the black back and the white lateral stripe, and although this band is often noticeable in *C. p. kuchingensis* it is much less marked: in series the two forms are quite distinct [3]).

Sciurus notatus serutus MILLER.

Sciurus serutus MILLER, Proc. U. S. Nat. Mus., 31, 1906, p. 58 ("Pulo Serutu").

Seroetoe, 1 ♂.

A pale form, not to be confused with the much more richly coloured *dulitensis* of Sarawak, but nearer to the paler *dilutus* also of the Bornean mainland from which, however, it can be distinguished by its greyer, less brown upper parts and, in the great majority of cases, by the less conspicuous black lateral stripe.

Skull: — greatest length, 49.4; condylo-basilar length, 41.3; palatilar length, 20.5; diastema, 10.8; zygomatic breadth, 28.1; interorbital constriction, 16.6; maxillary tooth-row (alveoli), 8.7 mm.

Sciurus notatus dulitensis BONHOTE.

Pontianak (Pematang Toedjoeh, Peniti, Batoe Ampat), 3 ♂, 1 ♀.

Relatively deeply coloured on the under parts. Three skulls measure. — greatest length, 50.8, 47.8 (*c*), 48; zygomatic breadth, 30.3, 30.5, 28.8; maxillary tooth-row (alveoli), 9.5, 9.4, 8.8 mm.

Sciurus tenuis parvus MILLER.

Peniti, Pontianak, 1 ♀ juv.

[1]) Ned. Tijdschr. voor de Dierkunde (Amsterdam), I, 1838, pl. I, fig. 3.
[2]) Proc. U. S. Nat. Mus., 33, 1907, p. 552.
[3]) *c.f.* E. BANKS, Proc. Zool. Soc., 1931, p. 1336.

Nannosciurus exilis exilis (S. MÜLLER).
Peniti, Pontianak, 1 ♂.

Rattus rattus form **argentiventer** ROB. and KLOSS.
Pematang Toedjoeh, Pontianak, 1 ♀ imm.
A young animal but already showing the grey under parts, three pairs of pectoral mammae, large teeth, long palatal foramina and swollen bullae characteristic of this form.

Rattus surifer serutus (MILLER).
Mus serutus MILLER, Proc. U. S. Nat. Mus., 31, 1906, p. 59 ("Pulo Serutu, Karimata Islands").
Seroetoe, 1 ♀.
Only one specimen, ex alcohol, and with the skull broken and the teeth unworn. The base of the dorsal fur and spines is grey and this rat is clearly only a dark, dull, subspecies of *Rattus surifer*. No series of *R. surifer* from the Kapoeas River basin seems ever to have been critically examined and this district may also be inhabited by a comparatively dull subspecies for LYON has remarked that specimens of the "*rajah* group" from south-eastern Borneo average brighter in colour than do those from the western part of the island. LYON's *rajah* group, however, perhaps includes individuals of two species, *R. rajah* and *R. surifer*.

Rattus rattus lamucotanus (LYON).
Epimys neglectus lamucotanus LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 100 ("Pulo Lamucotan, off west coast of Borneo").
Panebangan, 1 ♂.
This single, sub-adult and not full-grown specimen which externally is exactly like specimens of *R. r. jalorensis* of a similar age from the mainland of Borneo is, of course, useless for critical examination, but LYON has already referred rats from Panebangan to *R. r. lamucotanus*.

Rattus rattus subsp.
Mus neglectus MILLER, Proc. U. S. Nat. Mus., 31, 1906, p. 59 (Serutu and Karimata).
Seroetoe, 1 ♀.
Another single specimen of a rat with the teeth but little worn. The common field-rat is widely spread in the Karimata and adjacent small islands, forms of it being found on the tiny Poeloe Joeanta only a few miles from the coast, off Soekadana; Panebangan; Pelapis; Karimata and Seroetoe. From these islands LYON has recognised three forms, but our knowledge of these remains very incomplete. Rats from the inshore island of Joeanta LYON considers indistinguishable from the mainland form. On Panebangan, within the five fathom line, the rats are characterised by a slightly larger maxillary tooth-row. On Pelapis within the ten fathom line, is a form yet more differentiated for in addition to a large tooth-row it has large feet. The subspecies from Karimata and Se-

roetoe appears to remain undescribed although MILLER lists seven skins obtained by ABBOTT in 1904.

Tupaia gracilis edarata LYON.

Tupaia inflata LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 122 (Karimata).
Tupaia gracilis edarata LYON, op. cit., 45, 1913, p. 118 ("Karimata Island").
Karimata, 1 ♂.

As this subspecies was hitherto only known from the type, a young adult female with an imperfect skull, it is especially unfortunate that the skull of the present specimen is also broken and that no material of *T. g. inflata* of Banka and Billiton is available for comparison. In colour the skin is rather darker on the upper parts than in specimens of *T. gracilis* from Sarawak and British North Borneo. Owing to the condition of the skull no observations on the bullae, which in this subspecies and in *T. g. inflata* are supposed to be relatively larger than in typical *gracilis*, are possible. Compared with eleven skulls of typical *gracilis* the single skull from Karimata can be distinguished by its smaller cheek-teeth, a feature particularly noticeable in the case of pm^3.

Hind-foot (in the flesh, s.u.), 36 mm. Skull. — condylo-basal length, between 35 and 36 mm, maxillary tooth-row, 13 mm.

Galeopterus variegatus abbotti LYON.

Galeopterus abbotti LYON, Proc. U. S. Nat. Mus., 40, 1911, p. 126 ("Pulo Panebangan, off west coast of Borneo").
Panebangan, 1 ♂, 1 ♀.

Like all races of this very variable species, *abbotti* is difficult to define and judging from the above pair seems to rest on a thin colour character for I can discover no peculiarities in the skull and teeth.

The maximum condylo-basal length of the two known female skulls is 62.8 mm, but the material is insufficient to demonstrate that the race is smaller than other subspecies of *Galeopterus* found on small islands in Malaysia.

Skulls (female given first). — greatest length, 66.4, 63.8; condylo-basal length, 62.8, 59.6; zygomatic width, 41.4, 41.7; upper tooth-row, 30.7, 29.5 mm.

The two skins are normal in colour, the female in grey and the male in "brown" pelage, the colour difference between the sexes being strongly marked, a character distinguishing *abbotti* from *gracilis* of Serasan, South Natoena Islands in which form the sexes are almost alike. With its slightly brownish shoulders the female of *abbotti* listed above is, in colour, absolutely inseparable from some examples of *G. v. terutaus* from Terutau Island in the Straits of Malacca.

The Panebangan male is nearest to that of *perhentianus* being rather darker on the muzzle and crown than any male of *aoris* or *terutaus* but its fore-feet are less blackened than in *perhentianus* and from males of all three races the single male of *abbotti* differs in its browner, less grey, hind neck.

NOTES SUR LES PERROQUETS DU GENRE *EOS* ET LEUR DISTRIBUTION GEOGRAPHIQUE

par

R. SNOUCKAERT VAN SCHAUBURG

(Territet, la Suisse).

Le genre *Eos* fait partie de la famille des Loriidés et habite un grand nombre des îles orientales des Indes Néerlandaises ainsi que la Nouvelle Guinée. Le nom générique a été proposé par WAGLER (Monogr. Psittac. 1832, p. 494) en fixant comme type *Eos histrio.*

Le rouge est la couleur dominante chez ces perroquets (*fuscata* exceptée) mais varié d'autres couleurs diverses formant ensemble des dessins agréables à l'oeil. Queues courtes, becs variant du rouge à l'orange.

J'ai par devers moi quatre traités sur le genre *Eos.* En premier lieu celui du Dr. O. FINSCH dans sa Monographie sur les Psittaciens intitulée: Die Papageien, dont le Tome II, qui nous occupe plus spécialement ici, a paru en 1868 (voir pp. 781-809). Cet ouvrage, admirable du temps de sa parution, est aujourd'hui quelque peu désuet, surtout en cequi concerne la systématique et la nomenclature. Au cours d'une conversation que j'eus avec FINSCH il y a déjà une bonne trentaine d'années, il me dit à ce propos: „Ach, dieses Buch ist ja ganz veraltet". Courageusement, il en convenait lui-même.

FINSCH ne reconnaissait pas la validité du genre *Eos* et plaçait toutes les espèces de celui-ci dans le genre *Domicella* également établi par WAGLER l.c.p. 495. Plus tard, les auteurs, loin de confondre les deux genres en un seul, les ont expressément séparés.

Un autre savant qui s'est occupé des perroquets *Eos,* est le Professeur Dr. A. REICHENOW (Vogelbilder aus fernen Zonen, 1878-1883). En suivant l'exemple de FINSCH, il n'a pas cru pouvoir séparer le genre *Eos* et fait rentrer tous les Loriidés en question dans celui de *Domicella.* Le grand intérêt de ce livre de REICHENOW se trouve dans les planches coloriées représentant un très-grand nombre de Perruches et de Perroquets d'après des dessins de l'artiste allemand G. MÜTZEL.

En troisième lieu, le comte T. SALVADORI a traité de ces Perroquets dans le Catalogue of Birds in the British Museum, XX, 1891, pp. 18-31. Il admet la validité du genre *Eos,* et énumère les espèces en ajoutant à chacune une synonymie complète, ainsi que des descriptions détaillées du mâle, de la femelle et des jeunes et leur habitat.

Ce travail excellent de SALVADORI, de si grande utilité qu'il soit encore à nos ornithologistes contemporains, est cependant aujourd'hui quelque peu périmé.

Nous avons enfin l'ouvrage de M. G. M. MATHEWS, le Systema Avium Australasianarum en deux volumes. Dans le premier, daté de l'an 1927, il traite des Loriidés aux pages 285-287 et l'on y verra qu'il accepte la différenciation entre *Domicella* et *Eos* [1]). Je l'ai, de mon côté, adoptée également; en tout cas elle est la plus récente et, comme disent les Anglais, la plus up to date.

Le genre *Eos* est représenté les îles à l'est et au nord-est de Célèbes, aux Moluques et au groupe Halmahéra et habite aussi une grande partie de la Nouvelle Guinée, les îles Papous occidentales et celles situées dans la baie de Geelvinck, enfin les groupes Ténimber et Salomon.

Pour l'énumération des espèces, commençons par *histrio* [1]), le type désigné par WAGLER.

1. **Eos histrio histrio** (MÜLL.).

Psittacus histrio P. L. S. MÜLLER, Natursystem, Suppl. p. 76, 1776, île Sanghi ou Sanghir.

C'est le même oiseau qui, par la suite, a été nommé *Psittacus indicus* par GMELIN 1789 et *P. coccineus* par LATHAM 1790, ces deux auteurs lui assignant à tort comme patrie l'île Amboina.

FINSCH désignait ce perroquet sous le nom de *Domicella coccinea*, ce qui était erroné, puisque le nom conféré par MÜLLER était plus ancien de 14 ans. Il tenta de justifier cet acte à la page 882, tome II de sa monographie, mais cette justification ne saurait prévaloir aujourd'hui, le principe de la priorité dans les dénominations ayant, depuis longtemps, été universellement accepté. Mais FINSCH et d'autres avec lui ont agi de la même manière dans plusieurs cas. Un nom ne leur plaisant pas, ils le remplaçaient simplement par un autre, plus à leur goût.

E. h. histrio habite Sanghir où FORSTEN [2]) et WALLACE [3]) en ont collecté des exemplaires, L'oiseau a encore été obtenu dans l'île Siao par le Dr. A. B. MEYER [4]) et les explorateurs hollandais bien connus HOEDT et VAN DUIJVENBODE, tandis que l'Anglais J. HICKSON [5]) l'a trouvé dans la petite île Saha (Collection du British Museum).

Chez cet oiseau le rouge domine, mais varié de bleu au sommet du crâne et à partie supérieure du dos; il y a aussi des bandes bleues post-oculaires et pectorale. Brun-noirâtre sont les épaules, les extrémités des ailes et les parties extérieures des pennes caudales. Bec rouge-orangé.

[1]) *Domicella* signifie: fille de maison; *Eos* aurore et *histrio* comédien.

[2]) E. A. FORSTEN, zoologiste hollandais, connu par ses activités dans l'île de Célèbes en 1841 et 1842, où, malgré le mauvais état de sa santé, il réussit à réunir d'importantes collections; 4 espèces d'oiseaux de cette île ont été nommées en son honneur. Il mourut à Amboina au jeune âge de 32 ans.

[3]) A. R. WALLACE est si bien connu, qu'il semble superflu de le remémorer ici.

[4]) A. B. MEYER, zoologiste allemand, connu par ses voyages d'exploration aux îles Indo-orientales dans les années septante du siècle dernier; appelé par la suite à la Direction du Musée de Dresde. Ses collections nombrant euviron 4000 exemplaires ont été réparties entre plusieurs musées d'Europe.

[5]) J. HICKSON, zoologiste anglais, visita en 1885 et 1886 le nord de Célèbes, les îles Sanghir et Talaut. Il occupa plus tard une chaire de professeur à Manchester.

Le Dr. F. Brüggemann de Brême en possédait quinze exemplaires de Sanghir, deux de ceux-ci provenant de la collection Rosenberg [6]) et deux de celle de Fischer [7]) collectés en 1873 et 1874. Il s'y trouvait encore deux autres de Fischer sur les étiquettes desquels la provenance de Sanghir n'était point indiquée et que Brüggemann tenait de ce chef pour possiblement originaires de Célèbes. Il se peut que ces oiseaux aient été achetés à Ménado ou bien tués dans ces parages après s'être échappés de captivité. Le Prof. Schlegel a en effet relaté (Ned. Tijdschr. voor de Dierkunde III, 1866, p. 186) que parfois des perroquets de ce genre avaient été achetés aux habitants du Nord de Célèbes et les désignait sous le nom de *Lorius coccineus*. Mais pour autant que je sache, il n'a jamais été prouvé que l'espèce habite cette île à l'état sauvage réel.

2. **E. histrio talautensis** Meyer et Wiglesworth, Journ. f. Orn. 1894, p. 240, îles Talaut au nord de Sanghir.

Ces deux auteurs expliquent clairement les différences entre cette race et la race nominale dans leur grand ouvrage: Birds of Celebes I, p. 117. En général, la couleur rouge est plus étendue chez *talautensis* et les deux races peuvent, même non pourvues d'étiquettes, être facilement distinguées.

Ce perroquet se trouve, paraît-il, nombreux dans le groupe d'îles Talaut, d'où des individus sont parfois exportés à Célèbes. Meyer et Wiglesworth écrivent que son existence dans ces îles a été, en premier lieu, mentionnée dans une lettre de Rosenberg adressée à Finsch. L'oiseau existant dans la petite île Saha, lequel Salvadori plaçait en 1891 dans la forme nominale, se révéla plus tard comme appartenant à *talautensis* (voir la synonymie à la p. 117 des: Birds of Celebes).

3. **E. histrio challengeri** Salvadori, Cat. Birds Brit. Mus. XX, p. 22, 1891 (Iles Nanusa, situées au Nord-est des Talaut).

Cette race a été nommée d'après le navire „Challenger" à bord duquel une mission scientifique fit, au siècle dernier, un voyage d'exploration à plusieurs terres du lointain orient. Au cours de ce voyage on visita entre autres l'île Mélangis dans le groupe des Nanusa (Février 1875) où le Challenger fut accosté par des indigènes qui, dans leurs canots, apportèrent, avec d'autres produits de leur pays, quatre de ces perroquets rouges. Trois de ceux-ci furent remis au British Museum et ont servi de types à la description d'une sous-espèce nouvelle. Cette forme se distingue de la nominale par sa taille beaucoup plus petite et une bande thoracique bleue plus réduite et quelque peu mélangée de rouge.

[6]) K. B. H. von Rosenberg. Allemand, vécut de 1840 à 1871 dans l'archipel des Indes néerlandaises, où il remplit plusieurs fonctions, en dernier lieu celle de zoologiste attitré du Gouvernement. Pendant les années soixante il visita le nord et le centre de Célèbes et écrivit quelques traités et articles de périodiques. En 1864 il envoya quelques chasseurs indigènes à Sanghir. Il amassa d'extensives collections réparties ensuite entre les Musées de Darmstadt, Leyde, Lübeck et Dresde. Une bonne douzaine d'espèces d'oiseaux ont été nommées en son honneur.

[7]) G. Fischer, officier de santé aux Indes néerlandaises, d'origine allemande, collectionna à Célèbes et Borneo. Sa collection provenant de la Minahassa (Célèbes N.E.) et de Sanghir fut envoyée au Musée de Darmstadt. Finalement il occupa un poste gouvernemental à Ternate.

MEYER et WIGLESWORTH se sont demandé (p. 118) si ces oiseaux pourraient être des jeunes n'ayant pas atteint leur développement complet. Il serait pour sûr à désirer d'avoir pour examen un plus grand nombre de ces oiseaux, mais qui voudra se charger d'en aller chercher aux Nanusa?

4. **E. squamata squamata** (BODD.).

Psittacus squamatus BODDAERT, Table pl. enl. p. 42, 1783, le Lory de Guéby.
„ *guebiensis* GMELIN, Syst. Nat. p. 318, 1789, Guéby.
Lorius Wallacei FINSCH, Journ. f. Orn. p. 411, 1864, Waigéou.

En ce qui concerne ce perroquet, FINSCH est, à mon avis, peu clair et assez difficile à comprendre. Dans ses Papageien p. 792 il cite le *squamatus* de BODDAERT dans la synonymie de *Domicella schlegeli* instaurée par lui-même. Je crois pour ma part, que la confusion, de laquelle d'autres auteurs se sont d'ailleurs également rendus coupables, a été entre autres causée par le fait que ces messieurs refusaient d'admettre des formes différentes dans une seule et même espèce, se représentant géographiquement, c'est-à-dire occupant chacune une partie différente et limitée dans l'aire de dispersion générale de l'espèce. Un échantillon de cette manière de voir me fut une fois donné par FINSCH lui-même, qui, se trouvant un jour chez moi, sourit à l'idée émise par HARTERT et d'autres de considérer le Pouillot véloce des îles Canaries (*Phylloscopus collybita canariensis*) non comme une espèce distincte, mais comme un représentant géographique de la forme existante sur le continent d'Europe. Heureusement de nos jours de pareilles idées archaïques ont été abandonnées.

E. squamata a la tête entièrement rouge; un étroit collier, l'abdomen et les sous-caudales d'un violet pourpré, les ailes partie rouges, partie noires, mais quelques pennes de celles-ci et les plus longues scapulaires d'un pourpré foncé; la face supérieure de la queue rouge-pourpré, la face inférieure rouge et jaune-rougeâtre à reflets dorés vers l' extrémité. Bec rouge-orangé.

La dénomination *squamata* a probablement été inventée à cause du plumage du jeune présentant, par suite des bords pourprés des plumes rouges, un certain aspect écailleux.

D'après SALVADORI (Cat. B. Br. Mus. XX, p. 127) cette forme nominale habite les îles Papous occidentales: Waigéou, Guebé, Batanta ainsi qu'un îlot près de Misol. Il répète cette même distribution géographique dans son grand livre: Ornitologia della Papuasia e delle Molucche I, p. 256. REICHENOW (Vogelbilder aus fernen Zonen, non-paginé) et MATHEWS sont du même avis. Au British Museum on peut trouver des exemplaires de Waigéou de la collection WALLACE. SALVADORI en avait à sa disposition une belle série de cette même île de Batanta (coll. BRUYN) [8]) A Waigéou *squamata* a aussi été obtenue par GUILLE-

[8]) A. A. BRUYN, ancien officier de marine hollandais, se fixa par la suite à l'île Ternate et épousa une fille du grand commerçant VAN RENESSE VAN DUYVENBODE de cette même île après le décès duquel il lui succéda en affaires. Il avait coutume d'envoyer à bord de ses navires des chasseurs indigènes qui avaient pour mission de visiter diverses contrées pour collecter des peaux d'oiseaux destinécs principalement à des plumassiers de Paris, mais en partie aussi Musées d'Europe, surtout à celui de Gênes. BRUYN mourut vers 1880. Six espèces d'oiseaux portent son nom.

mard [9]), Bernstein [10]) et Platen [11]), ainsi que récemment par l'expédition Stein en 1931-32.

5. **E. squamata variegata** (Gm.).

Psittacus variegatus Gmelin, Syst. Nat. I, p. 319, 1789 „habitat in India", id est Halmahéra.

Psittacus cochinchinensis Latham, Ind. Orn. I, p. 116, 1790, Cochinchina (errore; aucune *Eos* n'habite la Cochinchine). Halmahéra.

Psittacus riciniatus Bechstein, Kurze Uebersicht, p. 69, pl. 4, 1811, Halmahéra.

Psittacus cucullatus Shaw, Gen. Zool. VIII, part II, p. 461, 1811, Moluccas (errore), Halmahéra.

Lorius isidorii Swainson, Zool. Illustr. série 2. pl. 8, 1832, Nouvelle Guinée (errore), Halmahéra.

Chez plusieurs auteurs le lecteur trouvera ce Lori cité sous le nom de *riciniatus* Bechstein et parmi ces écrivains figurent Finsch et Salvadori, qui ajoutent à ce nom une assez longue synonymie. Ces deux savants considéraient ce perroquet comme espèce à part et lui assignèrent un certain nombre d'îles comme patrie, entre autres Célèbes et le groupe Timorlaut (Ténimber) mais par erreur, puisqu'-aucune espèce d'*Eos* n'habite Célèbes à l'état naturel (voir ci-dessus) et que l'*Eos* de Ténimber n'est autre que *reticulata* Müller. Finsch indiquait aussi Waigéou comme habitat, ce qui est encore une erreur, cette île étant habitée par la forme nominale.

Il a donc régné jadis une certaine confusion explicable surtout par l'absence d'un nombre suffisant d'éxemplaires et dans bien des cas, l'incertitude de leur provenance.

Mathews considère le groupe Halmahéra, dans lequel sont comprises les îles Morotai, Ternate, Batchan, etc. comme patrie de *E. s. variegata*. Th. Pleske, Zur Vogelfauna der Insel Ternate (Bull. Acad. Impér. des Sci. de St. Pétersbourg 1884, Tome XII) désignait sous le nom de *riciniata* Bechst. les oiseaux qu'il avait obtenus de cette île et ne renseigne le lecteur sur leur biologie qu'en écrivant, qu'à l'état sauvage, ils sont extrêmement farouches.

Ceci paraît être conforme à l'expérience d'autres chasseurs qui ont trouvé la même difficulté d'approche chez les autres *Eos*. Il est vrai par contre que plusieurs ornithologistes prétendent le contraire.

Le Dr. Vorderman possédait de son temps des individus de Batchan, Hal-

[9]) F. H. Guillemard, Anglais, né en 1852, connu surtout par ses voyages à bord de la „Marchesa" au Kamtschatka et en Nouvelle-Guinée, au cours desquels il touche également à Célèbes. Il a décrit ses collections ornithologiques dans les Proceedings of the Zoological Society of London, année 1885. Il visita en outre la Laponie et quelques régions de l'Afrique. Trois espèces d'oiseaux ont été nommées en son honneur.

[10]) Dr. H. A. Bernstein, 1828-1865, Allemand, exécuta dans les années 1855-1865 d'importants travaux zoologiques dans l'archipel des Indes néerlandaises et mourut non loin des côtes de la Nouvelle Guinée. Des notices concernant la vie et les oeuvres de cet ornithologiste de mérite ont été publiées dans le Journal für Ornithologie, années 1866 et 1906. Cinq espèces d'oiseaux portent son nom.

[11]) Dr. C. C. Platen, zoologiste allemand, naquit en 1843. Il débuta en qualité de médecin à Amoy (Chine). Grand collectionneur-ornithologiste, il visita, le plus souvent accompagné de son épouse, quantité d'îles de l'archipel Indo-Malaisien où il fit de nombreuses collections. Celles-ci sont allées surtout au Musée de Brunswick et à celui de N. Nehrkorn à Riddagshausen. Six espèces ont été nommées en son honneur et, pour autant que je sache, cinq en celui de sa vaillante compagne.

mahéra et Ternate qu'il décrivit minutieusement dans: Natuurk. Tijdschr. Ned. Ind. 1891, pp. 189 et 190, pages auxquelles je me réfère.

Chez la forme en question le couleur rouge domine, mais l'occiput, une large bande pectorale ainsi que le centre de l'abdomen sont d'un beau lilas et les sous-caudales liliacées. La planche coloriée donnée par REICHENOW est inexacte en tant quélle présente les pattes brun-clair, tandis que, d'après les descriptions, elles sont noires.

6. **E. squamata obiensis** ROTHS.

E. variegata obiensis ROTHSCHILD, Bull. Brit. Orn. Cl. X, p. XVI, 1899, Obi.

Ne disposant pas du susdit n° du Bulletin, je ne saurais dire en quoi consiste la raison de différenciation de cette sous-espèce d'avec les autres. Je ne dispose pas non plus de l'Ibis de 1905, volume dans lequel une révision du genre *Eos* a, paraît-il, été publié. En revanche, j'ai par devers moi l'année 1866 du périodique hollandais: Ned. Tijdschr. voor de Dierkunde dans laquelle (Observations zoologiques III, p. 335) le Prof. SCHLEGEL s'occupe de quatre perroquets provenant du groupe Obi et envoyés au Musée de Leyde par le Dr. BERNSTEIN. Il s'agissait d'un mâle et de trois femelles, tous les quatre tués aux mois de juillet et d'août et présentant entre eux de notables différences dans la pigmentation violette de l'occiput et du cou, sans aucune uniformité, mais, malgré ces divergences faciles à constater, SCHLEGEL n'a pas hésité à réunir tous les sujets provenant des îles Halmahéra, Guebé, Waigéou ainsi que ceux d'Obi tout simplement sous le nous de *Lorius riciniatus*.

Cependant, sans aucun doute, Lord ROTHSCHILD en séparant et en nommant les oiseaux d'Obi, aura eu d'excellentes raisons pour cette manière de voir.

7. **E. squamata insularis** GUILL.

Eos insularis GUILLEMARD, Proc. Zool. Soc. London 1885, p. 565, île Wéda.

GUILLEMARD nota que cette „espèce" ressemble beaucoup à *Eos riciniata* BECHST. (i.e. *variegata* GMELIN) mais en diffère par les particularités suivantes: la macule occipitale violette est très-réduite et séparée du collier par une large bande rouge. Les deux collerettes nuchale et prépectorale violettes ne sont qu' étroites, tandis que le violet de l'abdomen ne s'étend pas jusqu'au thorax en laissant ainsi libre une large bande pectorale rouge. L'iris est rouge, tandis que *riciniata* a l'iris jaune.

Le petit groupe Wéda est situé dans le golfe de Wéda, au sud-est de Halmahéra.

8. **E. semilarvata** BONAPARTE, Consp. Gen. Av. I, p. 4, 1850, patria ignota.

Dérivée du mot latin *larva* = masque, l'appellation *semilarvata* (donc = à demi masquée) a été donnée à cette espèce en suite de la bande bleue qui couvre la partie inférieure de la tête rouge. Ce bleu s'étend depuis la mandibule inférieure jusqu'aux couvertures auriculaires. Sont également bleues les parties postérieures et une macule sur les scapulaires. Dessus des ailes rouge mêlé de noir, et la face inférieure en est rouge, mais devient plus foncée vers les pointes.

Il est à noter que pendant longtemps, l'on a ignoré d'où venait ce perroquet.

En en décrivant le type, individu adulte reçu au Musée de Leyde de la part de la Société zoologique d'Amsterdam, le Prince BONAPARTE ne pouvait en indiquer l'origine. Un second exemplaire (jeune) en fut envoyé par VON ROSENBERG au Musée de Darmstadt et ces deux oiseaux ont été minutieusement décrits par FINSCH (Papageien II, p. 795).

ROSENBERG en expédia encore quelques autres en Europe, en indiquant comme lieu de provenance probable les îles de la baie Geelvinck [12]) dans le Nord-est de la Nouvelle Guinée. Il n'en fournissait cependant aucune preuve. Dans une communication ultérieure il ne donna nulle indication précise à ce sujet et ne citait que: la Nouvelle Guinée, ce qui était, cela van sans dire, insuffisant, puisque trop général.

WALLACE, le grand voyageur, n'a jamais rencontré *semilarvata* mais avait quelque suspicion que son habitat se trouverait à Timorlaut. Et SALVADORI écrivait en 1891: Habitat unknown.

Ce n'est que bien plus tard qu'on soit parvenu à fixer cette patrie, qui n'est autre que l'île Céram. C'est le Professeur E. STRESEMANN qui l'a découverte et qui communiqua cette nouvelle dans les Nov. Zool. XXI, 1914, p. 82. STRESEMANN accompagnait en 1911 la: Zweite Freiburger Molukken-Expedition, laquelle visita Céram. Et ce ne fut qu'au cours de la seconde exploration de la chaîne de montagnes du centre que le domicile du perroquet en question fut découvert à des altitudes de 5000 à 6000 pieds. Dans cette région, ces oiseaux se montrèrent très-nombreux.

La patrie de *semilarvata* se trouve donc, pour autant qu'on le sache actuellement, dans la contrée montagneuse du centre de Céram (ou Séran) à partir d'une altitude de 5000 pieds.

9. **E. fuscata fuscata** BLYTH.

E. fuscata BLYTH, Journ. Asiatic Soc. of Bengal XXVII, p. 279, 1858. Patria ignota.

E. (Chalcopsitta) torrida GRAY, List Spec. Birds Brit. Mus. Psittaci, p. 102, 1859, Dorey, New-Guinea.

E. leucopygialis ROSENBERG, Journ. f. Orn. 1862, p. 64. Dorey.

Il existe, paraît-il, dans cette espèce, deux „phases" que l'on considérait autrefois comme simples différences d'âge. L'une se distingue par la couleur rouge, l'autre par la teinte jaune de certaines parties correspondantes du plumage.

La couleur des deux est principalement d'un brun foncé avec une macule jaune ou sommet de la tête. Les interscapulaires et les plumes jugulaires sont lisérées tantôt de grisâtre, tantôt d'olivâtre, ou bien parfois de rouge. La partie dorsale inférieure et l'uropygium (d'où le nom *leucopygialis* de ROSENBERG) sont blancs à lisérés noirs, les sous-caudales bleu-pourpré. On aperçoit un reflet pourpré sur les couvertures primaires des ailes et un autre reflet brun-marron sur les pennes proximales et secondaires. Les plus longues plumes à base rouge et les sous-alaires partiellement rouges. La face supérieure de la

[12]) surtout Biak, voir SCHLEGEL, Musée des Pays-Bas, 1864, *Psittaci* p. 124.

queue gris-pourpré et les pennes centrales rougeâtres à leur base et olivâtres vers l'extrémité. Bec rouge ou bien jaune-orangé.

Chez la phase rouge on distingue deux bandes rouges encerclant le jabot et la poitrine, tandis que cette même couleur apparaît au centre de l'abdomen et aux cuisses.

Répétons ici que les parties rouges de l'une des phases sont jaunes dans l'autre.

FINSCH lui-même, étant bon dessinateur, a représenté les deux phases à la planche 6, Papageien II, mais il explique ces dessins en disant qu'il tenait l'oiseau jaune pour le jeune de l'espèce et le rouge pour l'adulte. SALVADORI de son côté en décrivant les jeunes, écrit: Yellow, where the adult bird is red (Cat. B. Br. Mus. XX, p. 31) mais se rallia cependant par la suite à l'opinion de WALLACE et de VON ROSENBERG que l'on avait affaire à deux variétés (phases) distinctes.

Il est très-intéressant de lire ce que M. W. R. OGILVIE GRANT a écrit au sujet de ce perroquet aux pp. 222-224 du Jubilee Supplement no. 2 de l'Ibis 1915. Ce supplément contient le: Report on the birds collected by the Brit. Orn. Exped. and the WOLLASTON Exped. in Dutch New-Guinea. Au cours de ces Expéditions on put obtenir une bonne collection de *fuscata* dont 24 pièces furent soumises pour examen à M. GRANT. Ce travail terminé, l'auteur en conclud a que *fuscata*, se presente en effet en deux phases différentes, conclusion à laquelle d'ailleurs ROTHSCHILD et HARTERT étaient déjà parvenus avant lui. Les jeunes oiseaux sont, ajoute GRANT, reconnaissables à une autre répartition des couleurs et à leurs queues plus pointues.

L'expédition constata qu'aux bords du fleuve Mimika *E. fuscata* se trouve nombreuse. Aux environs de Wakatimi l'espèce venait par milliers passer la nuit. Ces oiseaux y arrivaient vers l'heure du coucher du soleil jusqu'à nuit complète par vols de plusieurs centaines et en poussant des cris assourdissants, et se posaient sur les arbres en rangs serrés. Parfois des branches se brisaient sous leur poids, ce qui causait une panique précisément au moment où les clameurs commençaient à cesser et les perroquets se remettaient alors à tournoyer en vociférant continuellement.

On se demande où pareille multitude d'oiseaux peut trouver les creux nécessaires à leur nichaison.

BLYTH, en décrivant l'espèce, ignorait d'où elle venait. Plus tard WALLACE la trouva près de Dorey (Manokwari) habitant la forêt vierge. Et par la suite on la rencontra en bien des localités différentes de la Nouvelle Guinée; ainsi à Amberbaki (LAGLAIZE) [13]), le sudest du pays, les monts Owen Stanley et Astrolabe, ainsi qu'à port Moresby. SALVADORI (Orn. Pap. e.d. Mol. I, p. 264) cite encore quelques autres localités: Andai (ROSENBERG), les monts Arfak (D'ALBERTIS) [14]). Le Prof. DE BEAUFORT cite la Baie d'Humboldt (Nova Guinea

[13]) L. LAGLAIZE, français, fit au cours des années quatre vingtièmes du dernier siècle, plusiers voyages dans l'archipel indien et envoya ses collections au Musée de Paris ainsi qu' à d'autres établissements.

[14]) l'Italien L. M. D'ALBERTIS parcourut la Nouvelle Guinée environ à la même époque que LAGLAIZE. Il visita également Célèbes et d'autres îles de l'archipel.

V, p. 405), Meek [15]) (Nov. Zool. XIX, 1912, p. 193) les fleuves Kumusi et Setakwa supérieur, les Snow Mountains, le Mont Goliath. Il en rapporta une quinzaine de *fuscata,* toutes, à l'exception de deux, de la phase rouge et un individu intermédiaire (Nov. Zool. XX, 1913, p. 483). Meek avait encore rencontré *fuscata* le long des fleuves Agabunga et Aroa (ibid. XIV, 1907, p. 453).

Il semble résulter de ce qui précède que *fuscata* habite presque toutes les localités de la Nouvelle Guinée qui lui conviennent.

10. **E. fuscata incondita** Meyer.

Eos incondita A. B. Meyer, Zeitschrift für gesamte Ornith. 1886, III, p. 6. pl. 1. Nouv. Guin. sudest et Jobi.

Le mot *incondita* signifie, sauf erreur, quelque chose de déréglé. Ce mot indiquerait-il une coloration quelque peu sortant des règles dans cette sous-espèce? Je ne saurais répondre à cette question, n'ayant pas à ma disposition la description originale.

Salvadori plaçait *E. incondita* dans la synonymie de *fuscata* (Cat. B. Br. Mus. XX, 1891, p. 30) mais d'autres auteurs, et parmi ceux-ci M. Mathews considèrent cette forme comme étant „bonne" (Syst. Av. Austr. I, p. 286, 1927). Mais où habite-'t-elle exactement? A. B. Meyer trouvait son habitat dans le sudest de la Nouvelle Guinée et à Jobi (= Japen), mais Mathews de son côté ne cite comme tel que cette dernière île et Salawati. Meyer écrivait encore qu'il était en possession d'exemplaires provenant de la Baie de l'Astrolabe (Nouv. Guin. sudest) de dimensions typiques et non petites comme celles de *E. f. fuscata,* tandis que chez les individus rouges la bande pectorale passe aussi au rouge en ne gardant pas exclusivement sa couleur olivâtre (Abhandl. und Berichte des Kön. Zool. und Anthropol. Ethnogr. Mus. Dresden no. 4, 1891, p. 6).

Il est intéressant de lire ce que le Prof. Stresemann écrivit en 1923 (Archiv für Naturgesch. Heft 8, pp. 46 et 47) où il traite du butin ornithologique de l'expédition du Dr. Bürgers dans la vallée du fleuve Sepik dans l'est de la Nouvelle Guinée. Il y soutient que *E. fuscata* peuple toute cette contrée depuis la plaine jusqu'à la zone forestière supérieure aussi bien que les îles Salawati et Jobi et que cette espèce est divisée en deux races, c'est-à-dire d'un côté *E. f. fuscata* Blyth, que l'on trouve à Salawati et dans la presqu'île Berau et *E. f. incondita* Meyer laquelle étend sa dispersion depuis le sudest de la Nouvelle Guinée, se dirigeant vers l'ouest jusqu'au nord où elle atteint le fleuve Mamberamo et l'île Jobi et depuis la côte du sud jusqu'aux contreforts du Sneeuw-Gebergte.

Stresemann mentionne aussi les dimensions des ailes dans les deux races: pour *fuscata* elles varient entre 149 et 152 millimètres, pour *incondita* de 156

[15]) A. S. Meek était le collectionneur-naturaliste réputé de Lord Rothschild pour le Musée de Tring. Homme intrépide, il ne craignait pas de visiter et d'explorer les îles réputées les plus dangereuses et en rapporta quantité de nouveautés. Il mourut en Nouvelle Guinée.

Meek a écrit un ouvrage sur ses voyages, intitulé: A Naturalist in Cannibal Land avec une préface de Lord Rothschild, édité par F. Fox, paru en 1913 à Londres et à Leipsic, illustré et très intéressant.

à 175. Ces dernières sont donc nettement plus grandes. Tous les exemplaires rapportés de ses voyages par le Dr. BÜRGERS ont été trouvés, après mensuration exacte, appartenir à *incondita*. Ces oiseaux étaient au nombre de 21 et STRESEMANN note de chacun d'eux les mesures, le sexe et le lieu de capture.

Le Dr. E. HARTERT, List of the Birds collected by E. MAYR (Nov. Zool. XXXVI, 1930, p. 103), mentionne sous le nom de *Eos fuscata incondita* les oiseaux de la collection faite par ce savant voyageur, savoir: 5 pièces rouges et une jaune provenant d'Ifaar (Baie Humboldt) ainsi que trois des Monts Cyclopes. HARTERT n'a pas trouvé dans cette série confirmation des différences de coloration d'après les données de A. B. MEYER, mais il ajoute que tous ces exemplaires sont de plus grande taille que ceux de la péninsule Bérau (Arfak).

On peut lire dans les Nov. Zool. XXXVIII, 1932, pp. 127-247 un très-intéressant compte-rendu par Lord ROTHSCHILD, le Prof. STRESEMANN et K. PALUDAN des résultats ornithologiques obtenus par l'expédition STEIN [16]) en Nouvelle Guinée au cours des années 1931 et 1932. Dans cet ouvrage Lord ROTHSCHILD a pris les perroquets pour son compte. A Waigéou et Numfor (= Mafor) d'autres espèces du genre *Eos* furent collectées, mais à Jobi (= Japen) une série de *fuscata*.

Ces oiseaux ne laissant pas de présenter quelques questions difficiles à résoudre, Lord ROTHSCHILD leur a consacré une page et demie et ce qu'il en dit, vaut bien la peine d'être étudié. Et puisque les Nov. Zool. ne se trouvent pour sûr pas en mains de chacun, il me semble utile de copier ici *verbatim* la relation (en allemand) de ROTHSCHILD. Il s'exprime en ces termes: „Die Art *Eos fuscata* scheint auf den ersten Blick ganz klar und leicht zu behandlen; aber bei näherer Untersuchung verschwindet diese Klarheit, und es ist schwer zu entscheiden ob alle Stücke einer und derselben Form angehören, oder ob sie in mehrere lokale Subspecies geteilt werden müssen. A. B. MEYER und SALVADORI haben schon gesagt, dass die Exemplare von Jobi grösser wären und lebhaftere Färbung hätten. Ferner hat Dr. A. B. MEYER, in Zeitschrift ges. Ornith, III, p. 6, Tab. 1, Fig. 2 den Namen *Eos incondita* den Exemplaren aus S.O. Neu-Guinea und Jobi gegeben. Dr. HARTERT hat diesen Namen subspecifisch angenommen in seine Neu-Guinea Arbeit über die Sammlung von Dr. ERNST MAYR (Nov. Zool. XXXVI pp 27-128, 1930), aber in der gemeinsamen Arbeit: Notes on Papuan Birds (Nov. Zool. VIII, p. 65, 1901) stimmte er damals mit mir überein, dass keine Formen abgetrennt werden könnten. Die erste Schwierigkeit stellt sich sofort ein mit dem Namen *Eos fuscata*. BLYTH hat einen fundortslosen Vogel beschrieben und daher ist es nicht möglich zu sagen welches Wohngebiet die typische Form haben sollte, wenn man die Art definitiv in Unterarten teilt. Ich werde aber, glaube ich, recht handlen wenn ich das zweite Zitat nur in Betracht ziehe und G. R. GRAY's Fundort: „Dorey = Manokwari" als

[16]) GEORG STEIN, accompagné de son épouse, visita les îles Waigéou, Numfor et Jobi et obtint dans la première une collection bien plus remarquable que celle de quiconque de ses prédécesseurs dans cette même île. Il réussit à prouver la nichaison de 14 nouvelles espèces, bien que son séjour n'y ait duré que du 6 Mai au 16 Juin.

typische Localität annehme. Ich habe bei der Bearbeitung von Stein's Serien aus Jappen (Jobi) und Manokwari im ganzen 88 Stücke verglichen und Flügelmaasse geprüft, 76 aus dem Tring Museum und 12 von Stein. Sie stammen aus den folgenden Fundorten: Manokwari, Arfak, Andai, Sorong, Ifaar, Humboldt Bay, Cyclops-Mts, Simbang, Constantin-Hafen, Friedrich-Wilhelms-Hafen, Stephansort, Upper-Setekwa-river, Snow Mts, Mt. Goliath, British New-Guinea, Nicuza, Mt. Cameron, Queen Stanley Range, Owgarra, Agabunga-river, Brown-River (Brit. N.G.), Avera, Aroa-river, Bihagi, Mambare-river, Kumusi-river, Hydographer Mts, Jobi, Ron Island".

Die Flügelmaasse sind wie folgt: 46 ♂♂, 142-167 mM; 36 ♀♀, 140-145 mM; 5? 145-167 mM. Das eine Stück von 144 stammt aus Arfak, das zweite vom Kumusi-river; das eine Exemplar mit Flügel 167 ist aus Jobi, das andere vom Brown-river. Diese Maasse beweisen, glaube ich, dass die Grösse zu stark variiert, um als gültiges Rassenmerkmal gebraucht zu werden, aber zusammen mit der Färbung können wir zwei Lokalrassen aufstellen:

Eos fuscata fuscata: Berau Halbinsel; düsterer, Flügel 140-152 mM.

Eos fuscata incondita: Uebriges Neu-Guinea und Inseln der Geelvinck-bai; leuchtender gefärbt, Flügel 144-167 mM."

On s'étonne de ne pas voir l'île Salawati figurer dans cette longue énumération de localités. L'exposé de Rothschild diffère quelque peu de celui de Stresemann. Ces deux auteurs veulent bien admettre l'existence de deux races, mais il reste toujours une certaine divergence d'opinion quant à la répartition géographique de ces deux formes. C'est, paraît-il, une question difficile à résoudre.

11. **Eos grayi** Mathews et Iredale, Austral Avian Record III, p. 46, 1915, Iles Salomon.

C'est l'espèce nommée *Eos cardinalis* jusqu'en 1915.

Lorius cardinalis Gray, Genera of Birds, App. p. 20, 1849, mais non *Psittacus cardinalis* Boddaert, Pl. enl. p. 30, 1783 lequel est un autre oiseau. Messieurs Mathews et Iredale sont arrivés à cette découverte, à la suite de laquelle il leur a fallu nommer à nouveau le perroquet en question.

Cet oiseau est à peu près entièrement rouge, le croupion et les supracaudales plus foncés, dos et ailes d'un rouge moins éclatant; les plumes des parties inférieures (poitrine et abdomen) lisérées de blanchâtre; la courbe de l'aile d'un bleu sombre pourpré, les pennes alaires et caudales rouge-brunâtre, lavées d'un soupçon d'olivâtre; bec orange-foncé, même quelquefois tirant au brunâtre, pattes noirâtres, iris brun-rouge.

D'où vient ce perroquet? Les voyageurs français Hombron et Jacquinot [17]) purent s'emparer d'un exemplaire aux îles Salomon (laquelle?) où ils touchèrent.

[17]) J. B. Hombron et C. H. Jacquinot prirent part à l'expédition des corvettes „Astrolabe" et „Zélée", années 1837-1840, le premier en qualité de médecin de bord et de zoologiste, le second commandant la „Zélée".

Leur navire ayant fait naufrage depuis, cet oiseau fut perdu, mais heureusement il en resta une image fidèle, quoique ne portant aucune indication de provenance (Voyage au Pôle Sud).

L'espèce habite les îles Salomon, ce qui est prouvé par quelques exemplaires conservés au British Museum et provenant de l'île Guadalcanar. D'autre part, le collectionneur RAMSAY en reçut plusieurs des Salomones. Au cours des années 1903 et 1904 A. S. MEEK, chargé de cette mission par le Musée de Tring, visita plusieurs îles de ce groupe important, et comme résultat envoya au Musée une série de 18 de ces oiseaux obtenus aux îles Rendova, Gizo, Choiseul et Bougainville. Cette série a d'autant plus de valeur lorsqu'on sait que MEEK était empêché de s'éloigner beaucoup des côtes, le climat des îles étant fort mauvais et les aborigènes se montrant sauvages et inimicaux (Nov. Zool. XII, 1905, pp. 243 et 252).

En 1869 le Dr. SCLATER reçut une petite collection d'oiseaux du capitaine du yacht „Chance", qui avait touché aux Salomones et dans cette collection, conservée dans l'alcool, *E. grayi* se trouvait représentée. La provenance d'un exemplaire reçu par SCLATER du Dr. BENNETT et que celui-ci disait originaire des Iles du Duke of York, paraissant incertaine, SALVADORI doutait de l'exactitude de ce renseignement (Cat. B. Br. Mus. XX, p. 23, note au bas de la page).

Je ne saurais dire ce qu'a pu récolter le Dr. E. MAYR lors de son assez récent voyage aux Salomones n'ayant pas été à même de consulter le ou les numéros des „American Museum Novitates" où il a traité des perroquets.

Mais voici en revanche quelques données géographiques intéressantes que j'emprunte aux Nov. Zool. 1926, pp. 38 et 44. Les frères EICHHORN (ou l'un d'eux) qui succédèrent à A. S. MEEK en qualité de naturalistes collecteurs pour le Musée de Tring, visitèrent en 1925 les petites îles Feni et Nissan, situées au sudest de la Nouvelle Irlande. Ces îlots forment, pour ainsi dire, une continuation de la lignée des grandes îles Salomones et leur faune présente un caractère essentiellement salomonien. EICHHORN rencontra *Eos grayi* dans ces deux petites îles, en récolta en Mai 10 exemplaires mâles et femelles à Féni et au mois de Septembre 10 autres à Nissan.

Le P. OTTO MEYER trouva ce qu'il appelait encore *Eos cardinalis* à l'île Tabar en grand nombre, mais moins commune à Lavangai au Nouvel Hanovre (Orn. Mon. Ber. 1927, p. 113). MEEK, de son temps, en rapporta quatre de Vella Lavella, île du groupe central des Salomones (Nov. Zool. XV, 1908, p. 355).

12. **Eos reticulata** (MÜLL.).

Psittacus reticulatus S. MÜLLER, Verhand. Nat. Gesch. Land- en Volkenkunde, p. 108, 1841, Tenimber.

„ *cyanostriatus* G. R. GRAY, Genera of Birds II, p. 417, no. 9. pl. 103, 1845.

„ *cyanostictus* SCHLEGEL, Handl. I, p. 184, 1857.

„ (*Eos*) *guttatus* ROSENBERG, Nat. Tijdschr. Ned. Indië, XXV, p. 145, 1863.

Le nom latin signifie: comme couvert d'un filet (rets).

Rouge, mais poitrine, cuisses et interscapulaires à teintes violettes et au dos quelques lignes bleues le long des baguettes des plumes; macule auriculaire bleu-foncé; couvertures alaires brun-noirâtre et lisérées de rouge. Pennes caudales centrales entièrement brun-noirâtre, les autres lisérées extérieurement de rouge, pâlissant *post mortem*. Pattes noirâtres ainsi le tour des yeux et la cire. Iris brun.

Type au Musée de Leyde.

Ce perroquet habite exclusivement le groupe Ténimber. Il y en a au British Muséum des exemplaires de Timorlaut et de l'île Maroe située au nord de cette terre.

H. O. Forbes (A Naturalist's Wanderings in the eastern Archipelago, 1885, p. 304) prétendait, bien que cet oiseau fût depuis longtemps connu de Timorlaut, avoir été sans doute le premier Européen qui y eût tué un exemplaire. C'est possible. Pendant longtemps les savants se sont disputés au sujet de la patrie de *reticulata;* Lesson nommait Bornéo, Blyth tenait pour Célèbes et Sclater et Schlegel pour Amboina, tandis que von Rosenberg se prononçait pour Céram (Séran). Tous étaient induits en erreur ayant vu dans les îles susnummées des individus en cage, ou bien aussi par les renseignements inexacts de leurs correspondants.

D'après Salvadori, c'est Gray qui a, le premier, fixé la vraie patrie de cette espèce, puisqu'il considérait comme y appartenant deux oiseaux du Brit. Mus. qui provenaient authentiquement de Timorlaut et avaient été présentés au Musée par un officier de la marine anglaise, le Capitaine W. Chalmers. Ces deux oiseaux sont les types de Gray's *Eos cyanostriata.*

Wallace a confirmé l'existence de *reticulata* à Timorlaut et nous a appris que des exemplaires de cette espèce avaient été parfois apportés par des pêcheurs Bouguinais qui revenaient des eaux de Timorlaut où ils s'étaient rendus pour la pêche du „tripang" et que pour cette raison on pouvait voir de temps à autre de ces oiseaux à Macassar et ailleurs, où ils ne sont pas indigènes.

Riedel [18]) procura par la suite une importante série de *reticulata* de Timorlaut au Dr. A. B. Meyer, parmi laquelle se trouvaient quelques jeunes. Meyer a décrit le plumage de ces jeunes dans la Revue: Sitzungsberichte und Abhandlungen der Gesellschaft „Isis" in Dresden 1884, p. 16.

13. **E. cyanogenia** Bonaparte, Consp. Gen. Av. I, p. 54, 1850, patria ignota.
Domicella cyanogenys Finsch, Papageien II, 1868, p. 796, nomen emendatum.

Le nom proposé par Finsch est, orthographiquement, certainement plus correct que celui donné par Bonaparte; il convient cependant de s'en tenir à

[18]) J. G. F. Riedel, fils d'un missionnaire habitant Célèbes, montrait beaucoup d'intérêt pour les sciences naturelles. Il fut au service civil dans la Minahassa et le Gorontalo (Provinces de Célèbes) et ensuite consécutivement aux îles Billiton, Timor et Amboina. En 1883 il quitta les Indes pour s'établir en Hollande. Il a publié un certain nombre d'ouvrages, entre autres sur le droit des gens, tandis qu'en même temps il collectionnait assidûment. Ses importantes collections furent destinées à plusieurs Musées d'Europa, e.a. celui de Leyde. Deux espèces d'oiseaux de Célèbes, ainsi que quatre originaires d'autres pays ont été nommées en son honneur.

celui-ci pour se conformer aux règles de la priorité. Les deux ont la même signification de: joue-bleue.

La couleur principale chez cet oiseau est un carmin quelque peu sombre; face supérieure de la queue, épaules et couvertures alaires presque noires; une large bande descendant de l'oeil et couvrant les joues et les côtés du cou, bleu-violet; bec rouge orangé, pattes noires, iris rouge.

Au début, la patrie de ce perroquet était aussi inconnue que celles des espèces précédentes. FINSCH et SALVADORI rapportent que des visiteurs blancs à Doré (Dorey en Nouv. Guinée) et environs en avaient acheté des exemplaires vivants aux Papous de ce voisinage, qui tenaient de ces oiseaux en captivité. Les vendeurs affirmaient que ces perroquets provenaient des environs de Dorey ou bien de l'île Jobi, ou encore d'ailleurs, mais personne n'en avait jamais rencontré à l'état sauvage dans ces contrées, à Jobi notamment ni MEYER ni BECCARI [19]). Ce dernier parcourut entre autres l'île Numfor pour y faire des collections zoologiques et profita de cette occasion pour visiter également la petite île Manem toute proche. Le butin qu'il rapporta de ces deux îles lointaines fut soumis à l'examen de SALVADORI, qui y trouva parmi les oiseaux trois races nouvelles qu'il s'empressa de décrire et de nommer. Ces mêmes trois races ont été retrouvées récemment par GEORG STEIN à Numfor et ce voyageur y a également obtenu une belle série de 28 pièces d'*Eos cyanogenia* (Nov. Zool. 1932, p. 208).

Il semble important de lire ici: Sitzungsberichte der Akad. der Wissensch. zu Wien, I Abt. 1874, p. 36. Une particularité intéressante à propos de *cyanogenia* a été relatée par MEYER dans ces mêmes Berichte, pp. 33 et 34. La voici, copiée de l'original: „Der Vogel besitzt einen schönen Hyacinthen- und Ananasgeruch, welchen viele Arten dieser Gattung haben, so stark, dass der Raum, in welche ueber Nacht einige der geschossenen Vögel aufgehängt waren, davon duftete".

Cette espèce habite quelques îles de la Baie Geelvinck: Numfor, Manem (= Manin) et Mysore. Chez MATHEWS, p. 287, un mot a été omis. En expliquant l'habitat de *cyanogenia*, cet auteur cite: Mafor (= Numfor), Pulo et Mysori. Derrière le mot Pulo (en français Poulo ou Poulou, et qui signifie: île) aurait dû suivre le nom Manem, celui-ci étant le nom de la petite île en question.

14. **E. bornea bornea** (L.).

Psittacus borneus L. Syst. Nat. Ed. X, vol. 1, p. 97, 1758. Habitat in India: Bornéo!

Psittacus chinensis MÜLLER, Natursyst. Suppl. p. 77, 1776, China!

Psittacus ruber GMELIN, Syst. Nat. I, p. 335, 1789, Habitat in Moluccis insulis et Nova-Guinea.

Psittacus moluccensis LATHAM, Ind. Orn. I, p. 116, 1790, Moluques.

Psittacus caeruleatus SHAW, Nat. Misc. pl. 937, 1810, Amboina.

Psittacus cyanurus SHAW, Gen. Zool. VIII, p. 538, 1812, Amboina.

[19]) O. BECCARI, Italien né en 1843, voyagea beaucoup dans les grandes îles des Indes Néerlandaises (1865-1871). Deux espèces de Célèbes portent son nom. Il fut en quelque sorte, un émule de WALLACE.

Il va sans dire que LINNÉ et MÜLLER se sont trompés en désignant respectivement Bornéo et la Chine comme patrie. L'oiseau en question n'existe dans aucun de ces deux pays. L'appellation *bornea* est d'ailleurs orthographiquement fautive. FINSCH en fit déjà la remarque et voulait l'amender en *borneonensis*, ce qui eût pour sûr valu mieux, mais malheureusement il y a la règle de priorité qui défend tout changement de nom primordial, même utile ou simplement désirable. La même loi de priorité s'oppose à l'usage du nom *ruber* de GMELIN, lequel aurait, en tout cas, été très acceptable.

Quatre formes de *E. bornea*, la nominale incluse, ont été décrites et admises par les auteurs.

Bel oiseau presque entièrement écarlate, les souscaudales et les plus longues plumes scapulaires bleues de même qu'une bande entre les cuises. Les trois ou quatre pennes alaires extérieures noires, mais rouges à leur base, les autres rouges à pointes noires, tandis que les pennes proximales sont noires à pointes bleues. Face supérieure de la queue rouge terne, inférieure rouge jaunâtre, mais rouge clair à la base. Bec rouge, pattes d'un noir mat, iris orange.

Des auteurs anciens comme FINSCH et SALVADORI, étaient d'accord que *Eos rubra* (GMELIN) *sensu lato* n'habitait que les îles Moluques, mais ne se rendaient point compte que parmi ces populations il existait des divergences géographiques. Une sous-espèce en a cependant été trouvée aux îles Kei, tandis que jamais encore une *Eos* ait été découverte dans le groupe Arou.

Il semble, d'après nos connaissances actuelles, que la forme nominale soit restreinte à Amboina. On trouve une liste des sous-espèces par STRESEMANN dans les Nov. Zool. XIX, 1912, pp. 339-341, et la même répartition a été adoptée par MATHEWS, p. 287.

15. **E. bornea rothschildi** STRESEMANN, Nov. Zool. XIX, 1912, p. 340, Seran (Céram).

Cette sous-espèce est nettement plus petite que *E. b. bornea;* chez 12 ♂♂ la longueur d'aile varie entre 154 et 163 mM et chez 5 ♀♀ entre 147 et 154. Chez les oiseaux d'Amboina les variations sont de 169-172 pour les mâles et de 160 à 169 pour les femelles. Pour le reste, déclara STRESEMANN, il n'y a pas de différences de coloration ni d'autres.

Le type, un mâle, provient de Manusela (Céram) à 3000 pieds d'altitude et la sous-espèce paraît être confinée à cette île.

On peut lire à propos de ce perroquet, quelques pages dans l'ouvrage de STRESEMANN intitulé: Aus den zoologischen Ergebnissen der II. Freiburger Molucken-Expedition, publié dans les Nov. Zool. XXI, 1914, pp. 25-153. STRESEMANN en personne prit part à cette expédition.

On trouve donc, comme habitant l'île en question, deux formes de *Eos:* 1e *semilarvata* (voir ci-dessus sous le no. 8) et *bornea rothschildi.* A cette dernière appartenaient deux exemplaires que j'ai reçus autrefois de M. le Baron F. K. VAN DEDEM, qui les avait obtenus dans la partie ouest de l'île.

16. **E. bornea bernsteini** ROSENB.

Eos bernsteini VON ROSENBERG, Nat. Tijdschr. Ned. Ind. XXV, p. 145, 1863, Iles Kei.
Domicella Schlegeli FINSCH, Die Papageien II, p. 792, 1868, Kei-Inseln.
Eos Kühni ROTHSCHILD, Nov. Zool. V, p. 110, 1898, Tual (Petit-Kei), coll. HEINRICH KÜHN.

Les adultes de cette forme sont en général semblables à *E. b. bornea* d'Amboina, mais en moyenne d'une taille un peu plus forte. ♂♂, ailes 171-178; ♀♀ 166-169 mM. Les jeunes au contraire sont bien différents et ont ainsi donné lieu à des descriptions et des noms nouveaux comme ceux cités dans la synonymie ci-dessus. STRESEMANN dit que ces jeunes présentent une coloration bleue commençant près de l'oeil et s'étendant en arrière jusqu'au cou; il se trouve aussi de petites plumes bleues au-dessus des yeux et les plumes de la gorge et du gésier sont lisérées de bleu. Cette description a été prise par STRESEMANN sur quatre individus jeunes dont il disposait à ce moment. Une planche en couleurs, représentant un jeune, figure aux Nov. Zool. V, 1898.

La patrie de *bernsteini* se trouve aux îles Kei. Le Musée de Tring en possédait des exemplaires provenant de Tual, Grande-Kei, Taam et Vertikur. Le Professeur H. SCHLEGEL, de son côté, écrivit en 1866 (Tijdschr. v.d. Dierk. III, p. 334) que ROSENBERG rencontra ce perroquet dans toutes les îles formant les groupes Céram-laut et Kei, c'est à dire: Manavolka, Matabello, Tior, Kloor, Petite et Grande-Kei.

STRESEMANN, à qui rien n'échappe, trouva de son côté que les *Eos* de Tior et Kisui dans le groupe Watubala au nord des Kei, de Goram et Céram-laut sont de taille intermédiaire entre *rothschildi* et *bernsteini* et que ces oiseaux pourraient donc être indiqués comme *bernsteini* ≒ *rothschildi*.

17. **E. bornea cyanonotus** (VIEILL.).

Psittacus cyanonotus VIEILLOT, Nouv. Dict. d'Hist. Nat. XXV, p. 334, 1817. Moluques. *Patria substituta* par HARTERT: Bourou.

L'appellation *cyanonotus* se rapporte sans doute à la couleur bleue des couvertures auriculaires chez le jeune oiseau. Les adultes se distinguent de toutes les autres formes de *bornea* par la nuance plus foncée et non écarlate ou rouge-clair surtout aux parties inférieures, du dos et des couvertures alaires supérieures. Longueur d'ailes: ♂♂ 151-158, ♀♀ 148-153 mm.

L'avifaune de l'île Bourou a été l'objet de quelques travaux intéressants. Citons SALVADORI (Ann. Mus. Civ. Genova VIII, 1876, pp. 366-386); FORBES, très-brièvement dans son livre: A Naturalist's Wanderings in the eastern Archipelago 1885. Cet auteur se borne à dire que le perroquet en question habite Bourou en le désignant cependant sous le nom d'*Eos rubra* sans y ajouter quoique ce soit.

Il existe ensuite sur Bourou un ouvrage d'HARTERT dans les Nov. Zool. VII, 1900, pp. 226-542 que je regrette beaucoup de ne pas avoir à ma disposition. Il y en a encore un autre de la plume du Professeur STRESEMANN dans les Nov. Zool. XXI, 1914, pp. 358-400. A propos de *E. b. cyanonotus* cet ornithologiste nous dit que chez ce perroquet le cercle intérieur de l'iris est gris, tandis que

l'extérieur est d'un rouge-jaunâtre, les pattes gris-noirâtre, le bec rouge-jaunâtre. Il ajoute que ces oiseaux sont communs en grands vols depuis la côte jusque dans les régions montagneuses (1800 m).

J'ai enfin par devers moi la „Fauna Buruana, Aves" de M. H. C. Siebers, parue en 1930 dans le présent périodique. L'auteur, très-exact et minutieux, y énumère 21 individus sur lesquels il nous renseigne par rapport au sexe, à l'âge, aux dates et lieux de capture, aux longueurs d'ailes etc., en y ajoutant nombre d'observations critiques, tous ces chiffres et communications empruntés au matériel de la grande collection amassée en 1921-22 à Bourou par M. L. J. Toxopeus.

Il convient, pour compléter cette brève étude, d'ajouter quelques lignes au sujet d'un perroquet, voisin des *Loriidae* (ou appartenant à cette famille) mais qui a eu le malheur d'être renvoyé par des auteurs compétents, d'un genre à l'autre.

Il s'agit ici de **Chalcopsitta rubiginosa** Bonaparte, Consp. Gen. Av. 1850, p. 3, Barabay et Guebé.

G. R. Gray (Liste des Psittacidés du Brit. Mus. 1859, p. 53, n'a pas hésité à transférer ce perroquet dans le genre *Eos,* exemple suivi depuis par Salvadori (Orn. Pap. e.d. Mol. I, p. 267 et Cat. B. Brit. Mus. XX, p. 29).

H. Schlegel de son côté (Mus. P. B. *Psittaci,* p. 129, 1864) avait pour cet oiseau l'appellation *Lorius rubiginosus;* de même Finsch (Neu-Guinea 1865, p. 157). Finsch l'a cependant placé par la suite (Papageien II, 1868, p. 781) dans le genre *Domicella* et encore plus tard, en 1876 (Journal Mus. Godeffroy XII, pp. 17 et 18) dans celui de *Trichoglossus,* exemple suivi d'ailleurs par d'autres ornithologistes.

Il n'existait donc aucune certitude sur la question de savoir à quel genre devrait être incorporé ce malheureux perroquet, mais toutes ces divergences d'opinion et renvois d'un genre à un autre ont cessé lorsque le Professeur A. Reichenow, tranchant ce fâcheux noeud gordien, proposa pour cet oiseau le genre *Oenopsittacus* [20]), entièrement nouveau (Séance de Janvier 1913 de la Deutsche Ornithologische Gesellschaft), nom fort approprié à ce perroquet couleur lie-de-vin. Cette proposition fut heureusement acceptée (Journ. f. Ornith. 1913, p. 401) et Mathews (Syst. Av. Austral. I, p. 295) s'y rallia.

Par cette résolution toute incertitude prit fin. Une figure en couleurs dans: „Vogelbilder aus fernen Zonen" de Reichenow représente *Oenopsittacus rubiginosus* (Bp.).

Quelle est maintenant la patrie de cette espèce? Bonaparte nota comme telle: Bonabay, ce qui revient à Ponapé ou Puynipet dans l'archipel des Carolines. Cette île porte encore le nom d'Ascencion et même plusieurs autres, je crois bien une dizaine. Il va sans dire que la localité Guebé, ainsi que celle de Waigéou, également citée plus tard, sont de pure invention.

J'ai en ma possession le Heft (cahier) 12, 1876 du Journal du Musée Godeffroy (Hambourg) dans lequel Finsch donna (pp. 15-40) un exposé des espèces

[20]) du grec οἶνος = vin.

d'oiseaux connus à cette époque de l'île Ponapé. Il y fait mention du perroquet en question sous le nom de *Trichoglossus rubiginosus* (voir ci-dessus) lequel était d'usage de son temps.

FINSCH, fort bien à la hauteur non seulement de l'ornithologie ancienne, mais aussi des voyages effectués anciennement et ayant eu pour but la récolte de matériel ornithologique, et non moins des personnalités des collectionneurs, écrivit aux pages précitées une revue bien documentée des recherches faites à Ponapé au cours des années révolues.

En voici quelques parties essentielles.

JEAN KUBARY, commissionné par le Musée Godeffroy, visita l'île au mois d'Août 1873 à bord du navire marchand „Iserbrook" appartenant à M. GODEFFROY. Il y demeura assez longtemps, tomba malada mais cependant n'oublia pas le but de son voyage. Les richesses collectées furent mises à bord du brick „Alfred" appartenant également à la flotte marchande de GODEFFROY, mais ayant malheureusement heurté un récif, ce bateau fit complètement naufrage. Le chargement fut perdu et l'on ne put sauver de ce désastre qu'une seule peau sur les 200 environ qui avaient été embarquées. Par contre, tous les exemplaires conservés dans l'alcool purent être sauvés et ceux-ci ont formé le matériel sur lequel FINSCH a basé sa revue critique.

L'exemplaire de *O. rubiginosus* qui a servi de type à BONAPARTE pour la description de sa nouvelle espèce, fut apporté en 1840 par le Capitaine ROSAMEL, commandant la corvette française „la Danaïde". Il est très-intéressant à noter que ce perroquet habite exclusivement la petite île Ponapé, située à l'extrême Est de l'archipel des Carolines. Il n'a été rencontré dans aucune des nombreuses autres îles de ce groupe.

NEW SPECIES OF *BUPRESTIDAE* FROM JAVA (COL.).

By

W. S. FISHER

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This paper is the result of a study of a collection of beetles received from Dr. L. G. E. KALSHOVEN, Forest Entomologist, Buitenzorg, Java.

My sincere thanks are extended to Doctor KALSHOVEN for the privilege of studying this interesting collection of *Buprestidae* and for his kindness in permitting me to deposit in the collection of the United States National Museum types of the new species collected by himself. Most of the paratypes are to be placed in the collection of the Zoological Museum, Buitenzorg.

Anthaxia acaciae, new species.

Male. — Elongate, strongly attenuate posteriorly, feebly shining, olivaceous brown, with a more or less distinct cupreous tinge, the head in front and lateral and anterior margins of pronotum greenish; beneath black, with a feeble cupreous reflection on the last abdominal segment.

Head narrower than pronotum at apex, with the front nearly flat, narrower at top than at bottom, lateral margins obliquely converging toward the top; surface coarsely, confluently ocellate punctate; eyes small and not projecting; epistoma broadly, arcuately emarginate in front.

Pronotum nearly one half wider than long, subequal in width at apex and base, widest near middle; sides arcuately rounded; anterior margin feebly sinuate, without a distinct median lobe; base transversely truncate; disk moderately convex, with a broad, vague depression on each side near posterior angle; surface finely, densely rugose, coarsely, confluently ocellate punctate. Scutellum ogival, the base truncate and surface densely granulose.

Elytra about as wide as pronotum at base, distinctly wider at base than behind middle; sides obliquely narrowed to behind middle (feebly, broadly constricted in front of middle), then strongly, arcuately narrowed to the tips, which are separately narrowly rounded and feebly, coarsely serrate; disk moderately convex, with narrow, rather deep, transverse, basal depressions; surface finely, very densely rugose, sparsely clothed with short, recumbent, inconspicuous hairs; sides of abdomen broadly exposed above.

Abdomen beneath coarsely, confluently, but not deeply, ocellate punctate; last segment broadly truncate at apex.

Female. — Differs from the male in being uniformly aeneo-cupreous above and beneath, and in having the head broader in front and the last abdominal segment broadly rounded at the apex.

Length, 4 - 4.5 mm; width, 1.4 - 1.5 mm.

Type locality. — Mid Java: Telawa (Semarang Residency).

Type and paratype. — In U.S. National Museum, Washington. *Paratype* in Zoological Museum, Buitenzorg.

Described from one male and two females (one male type) which were reared during December 1933 from *Acacia leucophloea* collected at the type locality by L. G. E. KALSHOVEN.

This species is allied to *attenuata* FISHER, but it differs from that species in having the front of the head obliquely narrowed from the bottom to the top.

Paracylindromorphus montivagus, new species.

Elongate, rather robust, strongly convex, moderately shining; head, pronotum, and scutellum black, with a feeble aeneous reflection; elytra black, with a feeble bluish or violaceous tinge; beneath aeneous.

Head as wide as pronotum at apex, strongly convex, with a large, deep depression on the front, and a narrow, longitudinal groove on the occiput; when viewed from above the front is deeply, angularly emarginate; surface finely, densely granulose, rather densely ocellate punctate, the ocelli not very distinct, small on the front, but becoming larger on the occiput, sparsely clothed with short, inconspicuous hairs; epistoma elongate, narrow between the antennae, strongly, obliquely expanded anteriorly, deeply, arcuately emarginate in front; antenna very short, serrate from the sixth joint.

Pronotum one fifth wider than long, subequal in width at base and apex, widest at apical third; sides slightly, arcuately rounded to near the posterior angles, which project slightly outward; anterior margin nearly truncate, without a distinct median lobe; base feebly sinuate, with the median lobe slightly produced and feebly, arcuately emarginate in front of scutellum; disk moderately convex anteriorly, broadly, transversely concave on basal half, with strongly elevated, slightly sinuate prehumeral carinae, extending from base to apical fifth; surface densely granulose, densely ocellate punctate, the ocelli very distinct, round, and completely closed, sparsely clothed with short, inconspicuous hairs. Scutellum small, triangular, the surface feebly reticulate.

Elytra as wide as pronotum at base, slightly narrower at base than behind middle; sides broadly, arcuately constricted in front of middle, arcuately expanded behind middle, then obliquely narrowed to the tips, which are separately obliquely subtruncate; disk strongly convex, broadly depressed on each side along lateral margin behind humerus, feebly depressed behind scutellum, with broad, rather deep, transverse, basal depressions; surface densely, finely granulose, transversely rugose basally, sparsely punctate, the punctures elongate and connected posteriorly to the rugae, sparsely clohed with short inconspicuous hairs.

Abdomen beneath feebly granulose, densely ocellate punctate, the ocelli open posteriorly, more distinct and more or less connected transversely on the basal segment, sparsely clothed with short, inconspicuous hairs.

Length, 4.75 - 5.75 mm; width, 1.12 - 1.5 mm.

Type locality. — Mid Java: Mt. Slamat, Batoerraden (Banjoemas Residency).

Other locality. — East Java: Mt. Raoeng (Besoeki Residency).

Type and paratypes. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from eleven specimens (one type). The type and six paratypes collected at the type locality during June and July 1925, August 1926, and August and September 1927, by F. C. Drescher; and four paratypes were collected on Mount Raoeng, Bajoekidoel Est., at an altitude of 450 to 700 meters, during October and December 1932, by H. Lucht. A few of the paratypes differ slightly from the type in having the head distinctly clothed with short, yellow hairs behind the epistoma; these are probably males.

This species is allied to *drescheri* Obenberger, but it differs from that species in being usually larger, and in having the head and pronotum only slightly aeneous, the elytra black and without a lateral carina on each elytron.

Agrilus javicola, new species.

Female. — Moderately robust, rather strongly flattened above, strongly shining, uniformly olivaceous green above, with a feeble brownish reflection in certain lights, and each elytron ornamented with a rather broad, inconspicuous vitta of yellowish hairs; beneath more brownish than above.

Head with front rather wide, slightly convex, about equal in width at top and bottom, lateral margins nearly parallel, with a vague, longitudinal depression on vertex and occiput; surface densely, coarsely rugose on front, longitudinally rugose on occiput, sparsely clothed with moderately long, recumbent, whitish hairs behind the epistoma; epistoma strongly transverse between the antennae, broadly, deeply, arcuately emarginate in front, the margins strongly elevated; antenna extending slightly beyond anterior margin of pronotum, serrate from the fourth joint, the serrate joints strongly transverse.

Pronotum one third wider than long, distinctly wider at apex than at base, widest near apex; sides slightly sinuate, obliquely narrowed from apex to posterior angles, which are nearly rectangular; when viewed from the side the marginal carinae strongly sinuate, narrowly separated anteriorly, but joined at base; anterior margin slightly sinuate, with the median lobe feebly produced and broadly rounded; base arcuately emarginate on each side, with the median lobe moderately produced and broadly rounded; disk evenly convex, without distinct depressions or prehumeral carinae; surface finely, closely, transversely rugose, nearly glabrous. Scutellum strongly, transversely carinate, the surface finely, densely reticulate.

Elytra slightly wider than pronotum at base, subequal in width at base and behind middle; sides broadly, arcuately constricted in front of middle, arcuately expanded behind middle, then arcuately narrowed to the tips, which are separately narrowly rounded and finely serrulate; sides of abdomen not exposed above; disk slightly, longitudinally flattened along sutural margins, which are slightly elevated posteriorly, and with broad, shallow, basal depres-

sions; surface finely, densely imbricate-punctate, sparsely clothed with short, inconspicuous hairs, and each elytron ornamented with a rather broad, inconspicuous vitta of sparsely distributed, short, recumbent, yellowish hairs, the vitta extending along sutural margin from basal depression to apex.

Abdomen beneath sparsely, feebly punctate, with transverse, crenulate lines, sparsely, uniformly clothed with short, recumbent, white hairs; first segment strongly convex at middle, the suture between the first and second segments not distinct at the sides; last segment broadly subtruncate at apex; vertical portions of segments rather densely pubescent; pygidium sparsely, coarsely punctate, longitudinally carinate, but the carina not projecting at apex. Prosternum coarsely, densely rugose, sparsely clothed with short, recumbent, white hairs; prosternal lobe broad, strongly declivous, slightly sinuate and rounded in front; prosternal process broad, the sides nearly parallel to behind the coxal cavities, then strongly narrowed to the apex. Tibiae slender, straight, unarmed at apices. Posterior tarsi one half as long as tibiae, the first joint as long as the following two joints united. Tarsal claws similar on all feet, cleft near the middle, the inner tooth broad and very short.

Male. — Differs from the female in having the head bright green and densely granulose in front, the prosternum more densely pubescent, the anterior and middle tibiae armed with a short tooth at apices, and the inner tooth of the tarsal claws slender, nearly as long as the outer tooth, and not turned inward.

Length, 4.5 - 5.75 mm; width, 1.2 - 1.5 mm.

Type locality. — Mid Java: Telawa (Semarang Residency).

Other locality. — East Java: Bodjonegoro (Bodjonegoro Residency).

Type and paratype. — In U.S. National Museum, Washington. *Paratype* in Zoological Museum, Buitenzorg.

Described from three specimens (one female type). The type and one male paratype were collected at the type locality during December 1931 by L. G. E. KALSHOVEN; and one male paratype was collected on shoots of *Acacia tomentosa* at Bodjonegoro, October 17, 1923, by the same collector.

This species is allied to *semarangi* OBENBERGER, but it differs from that species in having the head distinctly narrower in front, the epistoma deeply emarginate in front, the last abdominal segment broadly subtruncate at the apex, and in having each elytron longitudinally depressed along the sutural margin, and the depression clothed with yellow pubescence.

Agrilus telawensis, new species.

Male. — Moderately robust, strongly flattened above, rather strongly shining; head bluish green; pronotum dark brown, with a feeble aeneous tinge; elytra piceous, clothed with white pubescence except along lateral margins; beneath piceous, with a distinct aeneous tinge.

Head with the front rather narrow, slightly convex, about equal in width at top and bottom, lateral margins feebly, broadly constricted at middle, with a broad, shallow depression on vertex and occiput; surface coarsely, confluently

punctate, sparsely clothed with moderately long, semierect, white or yellowish hairs; epistoma strongly transverse between the antennae, feebly, arcuately emarginate in front, margins strongly elevated, and the surface pubescent; antenna extending to middle of pronotum, serrate from the fourth joint, the serrate joints about as wide as long.

Pronotum one half wider than long, wider at apex than at base, widest near apex; sides arcuately rounded anteriorly, then obliquely narrowed to the posterior angles, which are rectangular; when viewed from the side the marginal carina slightly sinuate, the submarginal carina straight, the two carinae rather widely separated anteriorly, but joined behind the middle; anterior margin strongly bisinuate, with the median lobe very strongly produced and broadly rounded; base angularly emarginate on each side, with the median lobe moderately produced and broadly subtruncate in front of scutellum; disk strongly convex, with a broad, shallow depression in front of scutellum, and with very short, arcuate, indistinct prehumeral carinae; surface finely, closely, irregularly, transversely rugose, and sparsely clothed with short, inconspicuous hairs. Scutellum strongly, transversely carinate, the surface finely, densely reticulate.

Elytra about as wide as pronotum at base, slightly wider at base than behind middle; sides nearly parallel to behind middle (feebly constricted in middle), then arcuately narrowed to the tips, which are separately narrowly rounded and feebly serrulate; sides of abdomen broadly exposed above; disk slightly depressed behind scutellum, with broad, shallow, basal depressions, but sutural margin not distinctly elevated; surface rather finely, densely imbricate-punctate, rather densely clothed with short, semierect, white hairs, except along lateral margins.

Abdomen beneath finely, densely granulose, sparsely punctate, with transverse, crenulate lines, which are coarser on basal segment, sparsely, uniformly clothed with short, recumbent, white hairs; first segment strongly convex at middle, the suture between the first and second segments not distinct at the sides; last segment broadly, arcuately emarginate at apex; vertical portions of segments not conspicuously pubescent; pygidium without a projecting carina at apex. Prosternum densely, coarsely rugose, densely clothed with long, erect, white hairs on median part; prosternal lobe broad, strongly declivous, broadly, feebly emarginate in front; prosternal process broad, the sides expanded to behind the coxal cavities, then obliquely narrowed to the apex, which is acutely rounded. Tibiae slender, slightly sinuate, the anterior and middle pairs armed with a short tooth at apices. Posterior tarsi about one half as long as the tibiae, the first joint as long as the following two joints united. Tarsal claws similar on all feet, cleft near the middle, the inner tooth shorter than the outer one, and not turned inward.

Length, 4 - 5 mm; width, 1.12 - 1.2 mm.

Type locality. — Mid Java: Telawa (Semarang Residency).

Type. — In U.S. National Museum, Washington. *Paratype* in Zoological Museum, Buitenzorg.

Described from two specimens (one male type) collected at the type locality during 1931 by L. G. E. KALSHOVEN. The paratype differs slightly from the type in having the pronotum about one third wider than long, and the prehumeral carinae more distinct, while the white pubescence on the elytra is more evenly distributed over the entire surface, and the prosternum is more sparsely clothed with white pubescence at the middle.

This species is allied to *semarangi* OBENBERGER, but it differs from that species in having the head distinctly narrower in front, the femora more robust, the prosternal process strongly expanded behind the coxal cavities, the prosternum of the male densely clothed with long, white pubescence at the middle, and in having the anterior margin of the pronotum strongly produced at the middle and the surface depressed in front of the scutellum.

Agrilus albizziae, new species.

Male. — Elongate, slender, slightly flattened above, strongly shining; antennae green; head greenish blue in front, becoming reddish cupreous on occiput; pronotum and elytra reddish cupreous, with a more or less distinct violaceous reflection, and each elytron ornamented posteriorly with a vague, narrow, yellowish pubescent vitta; beneath aeneous, with feeble greenish and reddish reflections in certain lights.

Head with the front rather wide, slightly convex, narrower at top than at bottom, lateral margins feebly, arcuately expanded at vertex, without distinct depressions; surface densely, finely granulose on front, longitudinally rugose on occiput, sparsely clothed with short, recumbent, white hairs; epistoma strongly transverse between the antennae, broadly, deeply, arcuately emarginate in front, the margins slightly elevated; antenna extending slightly beyond anterior margin of pronotum, serrate from the fourth joint, the serrate joints strongly transverse.

Pronotum one half wider than long, slightly wider at apex than at base, widest near apex; sides obliquely narrowed from near apex to posterior angles, which are rectangular; when viewed from the side the marginal and submarginal carinae slightly sinuate, widely separated anteriorly, but joined behind the middle; anterior margin feebly, arcuately emarginate, the median lobe not distinct; base angularly emarginate on each side, with the median lobe moderately produced and broadly subtruncate in front of scutellum; disk feebly, transversely depressed near the middle, without prehumeral carinae; surface glabrous, finely, densely, irregularly, transversely rugose, sparsely punctate between the rugae. Scutellum strongly, transversely carinate, the surface finely, densely reticulate.

Elytra slightly wider than pronotum at base, subequal in width at base and behind middle; sides feebly, broadly constricted in front of middle, arcuately expanded behind middle, then obliquely narrowed to the tips, which are separately narrowly rounded and finely serrulate; sides of abdomen broadly exposed above; disk feebly, longitudinally flattened posteriorly along sutural margins, with broad, shallow, basal depressions; surface rather coarsely imbri-

cate-punctate, sparsely clothed with short, inconspicuous hairs, and each elytron ornamented with a vague, narrow, yellowish pubescent vitta, extending along sutural margin from basal third to apex.

Abdomen beneath finely, densely granulose, sparsely punctate, with transverse crenulate lines, which are coarser on basal segment, sparsely, uniformly clothed with short, white, recumbent hairs; first segment convex at middle, the suture between the first and second segments not distinct at the sides; last segment subtruncate at apex; vertical portions of the segments not conspicuously pubescent; pygidium without a projecting carina at apex. Prosternum coarsely, densely rugose, sparsely clothed with short, semierect, white hairs; prosternal lobe broad, slightly declivous, broadly rounded in front; prosternal process rather narrow, obliquely narrowed to near the apex, which is acutely rounded. Tibiae slender, anterior and middle pairs slightly arcuate and armed with a short tooth at apices. Posterior tarsi about one half as long as tibiae, the first joint as long as the following two joints united. Tarsal claws dissimilar, anterior and middle pairs cleft near the tip, the teeth nearly equal in length and the inner tooth not turned inward; posterior claws cleft near the middle, the inner tooth broader and shorter than the outer one.

Female. — Differs from the male in having the front of the head broader, slightly rugose, and uniformly reddish cupreous, the tibiae unarmed at apices, and the tarsal claws similar on all feet, cleft near the middle, the inner tooth broader and shorter than the outer one.

Length, 4.25 - 5.5 mm; width, 1 - 1.4 mm.

Type locality. — Mid Java: Semarang.

Type and paratype. — In U.S. National Museum, Washington. *Paratypes* in Zoological Museum, Buitenzorg.

Described from eight specimens (one male type). The type and six paratypes were reared during March, April, and October, 1931, from "kedinding" (*Albizzia* sp.) collected in the teak forest at Semarang by L. G. E. Kalshoven; and one paratype was reared during March or April 1931, from *Buchania florida* collected in the type locality by the same collector. This species shows a slight variation in color, as a few of the paratypes are more olivaceous green than the typical form.

This species is allied to *semarangi* Obenberger, but it differs from that species in being more reddish cupreous above, in having the head narrower in front, the pronotum more strongly narrowed posteriorly, the prosternal lobe broadly rounded in front, the last abdominal segment subtruncate at apex, and in having each elytron ornamented with a narrow, yellow pubescent vitta along the sutural margin.

Agrilus drescheri, new species.

Male. — Robust, rather strongly flattened above, strongly shining; antennae cupreous; head aureous in front; head above, pronotum, scutellum, elytra, and beneath uniformly dark greenish blue.

Head with the front narrow, slightly convex, slightly wider at top than at bottom, lateral margins feebly, arcuately expanded at vertex, with a narrow, moderately deep, longitudinal depression on vertex and occiput; surface coarsely, irregularly rugose, the rugae more or less concentric on occiput, sparsely clothed with moderately long, recumbent, white hairs behind the epistoma; epistoma strongly elevated, slightly transverse between the antennae, transversely truncate in front; antenna extending nearly to base of pronotum, serrate from the fourth joint, the serrate joints longer than wide.

Pronotum one half wider than long, about equal in width at base and apex, widest near middle; sides feebly, arcuately rounded anteriorly, more obliquely narrowed posteriorly to the posterior angles, which are rectangular; when viewed from the side the marginal and submarginal carinae strongly sinuate, widely separated anteriorly, but joined behind the middle; anterior margin slightly sinuate, with the median lobe moderately produced and broadly rounded; base angularly emarginate on each side, with the median lobe slightly produced and feebly, arcuately emarginate in front of scutellum; disk strongly convex anteriorly, broadly, transversely concave behind the middle, with strongly elevated, arcuate prehumeral carinae, extending from base to middle, but not joined to the lateral margins; surface finely, closely, irregularly rugose, finely, sparsely punctate between the rugae, which are more or less interrupted, sparsely clothed with short, inconspicuous hairs. Scutellum strongly, transversely carinate, the surface finely, densely reticulate.

Elytra slightly wider than pronotum at base, subequal in width at base and behind middle; sides nearly parallel to behind middle (feebly, broadly constricted in front of middle), then arcuately narrowed to the tips, which are conjointly broadly rounded and finely serrulate; sides of abdomen rather broadly exposed above; disk feebly, longitudinally depressed along sutural margins, which are slightly elevated towards apices, and with broad, rather deep, basal depressions; surface finely, densely imbricate-punctate, densely, uniformly clothed with short, erect, inconspicuous hairs.

Abdomen beneath finely, sparsely punctate, with transverse, crenulate lines, which are coarser on basal segment, sparsely clothed with short, recumbent, white hairs; first segment slightly flattened and densely clothed with long, recumbent, white hairs at middle, the suture between the first and second segments not distinct at the sides; last segment deeply, arcuately emarginate at apex; vertical portions of segments not conspicuously pubescent; pygidium without a projecting carina at apex. Prosternum coarsely, densely rugose, sparsely clothed with white hairs, which are long and erect at middle, and shorter and more recumbent toward the sides; prosternal lobe broad, strongly declivous, broadly but not deeply, arcuately emarginate in front; prosternal process broad, strongly expanded behind the coxal cavities, transversely truncate at apex, with a broad, acute, median tooth. Tibiae slender, straight, unarmed at apices. Posterior tarsi about one half as long as tibiae, the first joint as long as the following

two joints united. Tarsal claws nearly similar on all feet, cleft near the middle, the inner tooth slightly shorter than the outer one, and not turned inward.

Length, 5.5 mm; width, 1.5 mm.

Type locality. — East Java: Mount Raoeng (Besoeki Residency).

Type. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from two males (one type) collected on Mount Raoeng, Bajoekidoel Est., at an altitude of 450 to 700 meters, November 12, 1931, by F. C. Drescher.

This species resembles *kalshoveni* Obenberger, but it differs from that species in being more elongate, in having the pronotum broadly and transversely concave posteriorly, with strongly elevated prehumeral carinae, and in having the last abdominal segment deeply emarginate at the apex.

Agrilus bauhiniae, new species.

Female. — Rather slender, rather strongly flattened above, moderately shining, uniformly black, with a feeble, violaceous reflection, the elytra ornamented with white pubescent designs; beneath piceous, with the legs more or less greenish.

Head with the front broad, slightly convex, wider at top than at bottom, lateral margins nearly straight, feebly, broadly concave on vertex and occiput; surface finely, densely granulose, finely, sparsely punctate, feebly rugose, sparsely clothed with short, recumbent, white hairs behind the epistoma; epistoma strongly elevated, slightly transverse between the antennae, transversely subtruncate in front; antenna extending to middle of pronotum, serrate from the fourth joint, the outer joints about as wide as long.

Pronotum nearly one third wider than long, subequal in width at base and apex, widest near apex; sides feebly rounded anteriorly, feebly, obliquely narrowed posteriorly to the posterior angles, which are rectangular; when viewed from the side the marginal and submarginal carinae slightly sinuate, rather widely separated anteriorly, but joined near the base; anterior margin moderately sinuate, with the median lobe slightly produced and broadly rounded; base arcuately emarginate on each side, with the median lobe slightly produced and feebly, arcuately emarginate in front of the scutellum; disk strongly convex, with a broad, shallow depression in front of scutellum, and with strongly elevated, sinuate prehumeral carinae, extending from posterior angles to lateral margins at apical third; surface nearly glabrous, finely, densely granulose, finely but not closely, irregularly rugose, finely, sparsely punctate between the rugae. Scutellum strongly, transversely carinate, the surface finely, densely reticulate.

Elytra wider than pronotum at base, slightly wider at base than behind middle; sides feebly, broadly constricted in front of middle, slightly expanded behind middle, then obliquely narrowed to the tips, which are separately narrowly rounded and finely serrulate; sides of abdomen broadly exposed above; disk rather deeply depressed behind scutellum, narrowly, longitudinally depres-

sed along sutural margins near apices, and with broad, deep, basal depressions; surface finely, densely imbricate-punctate, densely clothed with short, inconspicuous hairs, and each elytron ornamented with white pubescence as follows: A small spot behind the scutellum, a large triangular spot along sutural margin at middle, and a broad vitta extending along sutural margin from apical third to apex.

Abdomen beneath sparsely, finely punctate, with a few transverse, crenulate lines on basal segments, sparsely, uniformly clothed with short, recumbent, white hairs; first segment convex at middle, the suture between the first and second segments not distinct at the sides; last segment broadly rounded at apex; vertical portions of second segment ornamented with a white pubescent spot; pygidium without a projecting carina at apex. Prosternum finely, sparsely punctate, feebly rugose, sparsely clothed with short, recumbent, white hairs; prosternal lobe broad, strongly declivous, broadly, arcuately emarginate in front; prosternal process broad, strongly expanded behind the coxal cavities, then obliquely narrowed to the apex, which is acutely rounded. Tibiae slender, the anterior and middle pairs slightly arcuate, unarmed at apices. Posterior tarsi two thirds as long as the tibiae, the first joint as long as the following three joints united. Tarsal claws similar on all feet, cleft near the middle, the inner tooth broader and shorter than the outer one, and not turned inward.

Male. — Differs from the female in having the head light blue and finely, densely granulose in front, the anterior and middle tibiae armed with a short tooth at apices, and the inner tooth of the anterior and middle tarsal claws slender, nearly as long as the outer tooth.

Length, 4 mm; width, 1 mm.

Type locality. — Mid Java: Gedangan (Japara-Rembang Residency).

Other locality. — East Java: Tjepoe (Bodjonegoro Residency).

Type. — In U.S. National Museum, Washington. *Paratype* in Zoological Museum, Buitenzorg.

Described from two specimens (one female type). The type was reared during March or April 1933 from "kendajakan" (*Bauhinia malabarica*), collected at the type locality by L. G. E. KALSHOVEN; and one male paratype was collected at Tjepoe, September 29, 1925, at light, by FR. A. TH. H. VERBEEK.

This species can be distinguished from the other known species of this genus found in Java by being uniformly black, and in having each elytron ornamented with white pubescent spots and narrowly rounded at the apex.

Meliboeus monticola, new species.

Elongate, robust, strongly convex, strongly shining; head and pronotum aeneous; elytra violaceous black; beneath aeneous, with the legs black.

Head with the front wide, strongly convex, feebly gibbose on vertex, but without distinct depressions; surface coarsely rugose, the rugae transverse on the front but becoming concentric on the gibbosities, sparsely, coarsely punctate between the rugae, sparsely clothed with short, recumbent, yellowish hairs;

epistoma as wide as long between the antennae, broadly, arcuately emarginate in front; clypeal suture not distinct.

Pronotum one half wider than long, distinctly narrower at apex than at base, widest at basal fourth; sides feebly margined and very finely crenulate, arcuately rounded from apical angles to basal fourth, then obliquely narrowed to the posterior angles, which are obtusely rounded; anterior margin strongly sinuate, with the median lobe moderately produced and broadly rounded; base broadly, arcuately emarginate on each side at elytral lobe, the median lobe strongly produced and broadly rounded in front of the scutellum; disk strongly, broadly gibbose at middle, broadly, transversely concave behind middle, broadly flattened at the sides; surface coarsely but not closely, transversely rugose, except on the gibbosity, where the rugae are more or less concentric, the intervals smooth, with elongate punctures connected posteriorly to the rugae. Scutellum triangular, strongly acuminate posteriorly, the surface finely reticulate.

Elytra as wide as pronotum at base, slightly wider at base than behind middle; sides parallel behind humeral angles, broadly, arcuately constricted in front of middle, arcuately expanded behind middle, then obliquely narrowed to the tips, which are separately broadly rounded and feebly dentate; disk strongly convex, feebly, broadly depressed along sutural margins behind middle; surface very coarsely, transversely rugose basally, becoming smoother toward apices, intervals with coarse, elongate punctures connected posteriorly to the rugae.

Abdomen beneath convex, glabrous, densely marked with fine, crenulate lines. Prosternum very coarsely, transversely rugose, sparsely pubescent; prosternal process with the sides parallel to behind the coxal cavities, then abruptly narrowed to the apex, which is acute. Tarsi and tarsal claws black; tarsal lamellae brownish white.

Length, 5 mm; width, 1.8 mm.

Type locality. — Mid Java: Mt. Slamat, Batoerraden (Banjoemas Residency).

Type. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type). The type was collected at the type locality, August 30, 1932, by F. C. Drescher, and the paratype was collected at the same locality, January 9, 1932, by the same collector. The paratype differs slightly from the type in having the front of the head bluish.

Meliboeus insulicola, new species.

This species resembles *monticola* Fisher very closely, but it differs from that species in having the head cupreous in front, but becoming violaceous black on the occiput, the pronotum and elytra black, with distinct bluish and violaceous reflections, beneath more or less cupreous, with the legs darker, the sides of the pronotum more parallel posteriorly and the basal lobe broadly truncate in front of the scutellum.

Length, 4.25 - 4.5 mm; width, 1.5 - 1.75 mm.

Type locality. — Mid Java: Koebangkangkoeng (Banjoemas Residency).

Other locality. — Mid Java: Patimoean; Noesa Kambangan Island (Banjoemas Residency).

Type and paratype. — In the F. C. DRESCHER collection. *Paratype* in U.S. National Museum, Washington.

Described from three specimens (one type), all of which were collected by F. C. DRESCHER. The type was collected at the type locality, March 31, 1932; one paratype was collected at Patimoean, January 5 - 10, 1926; and one paratype was collected on Noesa Kambangan Island, November 17 - 20, 1927. The paratype from Noesa Kambangan Island differs slightly from the type in having the head bright green in front, the sides of the pronotum aeneous, the prosternum more densely pubescent, and the underside of the abdomen with a distinct rosy tinge. This is probably a male.

If a large series of specimens of this genus was available for study, both *monticola* and *insulicola* may prove to be only color varieties of *javanicus* OBENGERGER.

Cisseicoraebus montanus, new species.

Elongate, subcylindrical, strongly flattened above, broadly rounded in front, moderately attenuate posteriorly, strongly shining, uniformly dark brown, with distinct reddish, olivaceous green, and violaceous reflections in certain lights, the pronotum broadly clothed on each side with white pubescence, and the elytra ornamented with inconspicuous, white pubescent spots.

Head with the front wide, narrower at top than at bottom, lateral margins obliquely narrowed from bottom to top, broadly, deeply depressed from epistoma to occiput, the depression extending nearly to the lateral margins; surface very sparsely, coarsely punctate, clothed with a few long, semierect, white hairs behind the epistoma; epistoma uneven, transverse between the antennae, broadly, deeply, arcuately emarginate in front, and transversely, biarcuately carinate at middle; antenna extending to apical fourth of pronotum, serrate from the fourth joint, the outer joints strongly transverse.

Pronotum twice as wide as long, distinctly narrower at apex than at base, widest at middle; sides strongly, arcuately rounded, with the margins distinctly crenulate; anterior margin strongly sinuate, with the median lobe moderately produced and broadly rounded; base broadly, arcuately emarginate on each side, with the median lobe feebly produced and broadly truncate in front of the scutellum; disk convex anteriorly, feebly, broadly, transversely depressed on basal half, broadly, deeply depressed on each side, the depression becoming narrower towards apical angles, without prehumeral carinae; surface with irregular, crenulate lines anteriorly, sparsely, coarsely punctate posteriorly, finely, densely punctate towards the sides, sparsely clothed on median part with short, inconspicuous hairs, the depression on each side densely clothed with short, recumbent, white hairs and efflorescence. Scutellum subcordate, acuminate at apex, the surface flat and obsoletely punctate.

Elytra as wide as pronotum at base, subequal in width at base and behind

middle; sides finely crenulate, broadly constricted in front of middle, arcuately expanded behind middle, then obliquely narrowed to the tips, which are broadly truncate, and each armed with four or five long, acute teeth; disk moderately convex, longitudinally depressed along sutural margins, causing a more or less distinct longitudinal costa at middle of each elytron, sutural margins slightly elevated posteriorly, with broad, deep, basal depressions; surface finely, sparsely punctate along sutural margins, sparsely imbricate-punctate toward the sides, sparsely, uniformly clothed with short, erect, inconspicuous hairs, and each elytron ornamented with more or less distinct, white pubescence as follows: Four rounded spots along sutural margin, three or four similar spots distributed longitudinally on the median part, two transverse spots along lateral margin, and a transverse spot at apex.

Abdomen beneath imbricate-punctate, coarsely, sparsely on median part, feebly, densely toward the sides, nearly glabrous at middle, rather densely clothed with fine, recumbent hairs at the sides; last segment broadly rounded at apex. Prosternum flat, coarsely, sparsely punctate, clothed with a few erect, inconspicuous hairs; prosternal lobe strongly declivous, broadly, deeply emarginate in front and forming an obtuse lobe on each side; prosternal process flat, broadly rounded at apex. Mesosternum, metasternum, and posterior coxae densely clothed with white pubescence and efflorescence.

Length, 12 mm; width, 3.75 mm.

Type locality. — Mid Java: Mt. Slamat, Batoerraden (Banjoemas Residency).

Type. — In the F. C. DRESCHER collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type). The type was collected at the type locality, December 8, 1925, by F. C. DRESCHER, and the paratype was collected at the same locality, April 3, 1926, by the same collector.

This species is allied to *grandis* KERREMANS, but it differs from that species in being narrower and more acuminate posteriorly, in having a distinct longitudinal costa on each elytron, and by the different arrangement of the white pubescence on the elytra.

Sambus javicola, new species.

Elongate, moderately robust, rather strongly convex, strongly shining; head bright aureo-virideous in front, becoming piceous on the occiput; pronotum, scutellum, and elytra piceous, with feeble greenish and violaceous reflections in certain lights, the pronotum more or less greenish towards the sides, and the elytra ornamented with white pubescent designs; beneath piceous, with a greenish or aeneous tinge.

Head with the front nearly flat, narrowly, longitudinally depressed on vertex and occiput; surface coarsely, transversely rugose on the front, the rugae becoming concentric on the occiput, coarsely, sparsely punctate between the rugae, sparsely clothed with short, semierect, yellowish hairs; epistoma rather wide between the antennae, subtruncate in front; antenna green, extending

to basal third of pronotum, serrate from the fifth joint, the outer joints strongly transverse.

Pronotum twice as wide as long, slightly wider at base than at apex, widest at middle; sides regularly, arcuately rounded, margins finely crenulate, posterior angles obtusely angulated; anterior margin, strongly sinuate, with the median lobe feebly produced and broadly rounded; base strongly, arcuately emarginate on each side at elytral lobe, the median lobe strongly produced and broadly truncate in front of the scutellum; disk strongly convex anteriorly, broadly, transversely depressed posteriorly, the sides strongly, broadly flattened, with feebly elevated, arcuate lateral carinae, extending from base to apical fourth; surface finely, sparsely punctate, finely reticulate, the reticulation more or less concentric on the elevated area, sparsely clothed with short, semierect hairs, the hairs black on convex area and white towards the sides and along base. Scutellum large, triangular, strongly acuminate posteriorly, the surface densely, finely reticulate.

Elytra as wide as pronotum at base; sides nearly parallel to behind middle, then arcuately narrowed to the tips, which are conjointly broadly rounded and feebly serrulate; disk strongly convex, broadly depressed along the lateral margins behind humeri, with broad, shallow, basal depressions; surface finely, sparsely punctate, transversely reticulate basally, sparsely clothed with short, semierect, inconspicuous, black hairs, and each elytron ornamented with white pubescence as follows: A few scattered hairs in basal region, a narrow, broken, transverse fascia at middle and extending along the lateral margin to humeral angle, a round spot in front of this fascia, two narrow, transverse, zigzag fasciae at apical fourth, the two fasciae joined on each side to a narrow vitta extending along the sutural and lateral margins to the apex.

Abdomen beneath with finely, transversely crenulate lines, which are coarser and denser on basal segments, and sparsely clothed with short, inconspicuous hairs.

Length, 3.25 mm; width, 1.3 mm.

Type locality. — Mid Java: Babakan (Banjoemas Residency).

Type. — In the F. C. DRESCHER collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type). The type was collected at the type locality, November 27, 1932, by F. C. DRESCHER, and the paratype was collected at the same locality, October 31, 1926, by the same collector. The paratype differs slightly from the type in having the antennae and front of the head bright greenish blue.

This species is allied to *luzonicus* FISHER, but it differs from that species in being more robust, and in having the epistoma subtruncate in front, the elytra not expanded behind the middle, and by the different arrangement of the white pubescent designs on the elytra.

Cryptodactylus albofasciatus, new species.

Rather robust, strongly flattened above, rather strongly shining; head red-

dish purple; pronotum, elytra, and body beneath purplish black, with a feeble bluish reflection in certain lights, the elytra ornamented with distinct, white pubescent designs; scutellum aeneous.

Head with the front rather broad, strongly convex, broadly, deeply, longitudinally depressed from epistoma to occiput, the depression slightly wider on occiput and behind the epistoma; surface coarsely, irregularly rugose, the rugae more or less longitudinal on the occiput, sparsely punctate between the rugae, clothed with a few short, recumbent, white hairs; antenna extending to basal fourth of pronotum, serrate from the fifth joint, the serrate joint strongly transverse; epistoma very narrow between the antennae, broadly, feebly emarginate in front, the lateral margins strongly elevated.

Pronotum nearly twice as wide as long, about subequal in width at base and apex, widest near basal third; sides strongly, arcuately rounded, more obliquely anteriorly, margins vaguely crenulate, the posterior angles broadly rounded; anterior margin moderately sinuate, with the median lobe rather strongly produced and broadly rounded; base deeply, angularly emarginate on each side at elytral lobe, with the median lobe strongly produced and broadly truncate in front of scutellum; disk moderately convex, with a broad, moderately deep depression on each side at basal third, and with strongly elevated, arcuate lateral carinae, which do not extend to the base or apex; surface coarsely, irregularly reticulate, the reticulations more or less concentric on the median part, finely, sparsely punctate, sparsely, irregularly clothed with short, recumbent, white and inconspicuous black hairs intermixed. Scutellum large, triangular, strongly acuminate posteriorly, the surface densely granulose.

Elytra at base equal in width to pronotum at basal third, subequal in width at base and behind middle; sides strongly, arcuately constricted at middle, arcuately expanded behind middle, then arcuately narrowed to the tips, which are conjointly broadly rounded; disk moderately convex, with broad, basal depressions; surface densely, coarsely imbricate-punctate, sparsely clothed with short, inconspicuous hairs, and each elytron ornamented with white pubescence as follows: A narrow ring in front of middle along sutural margin, two narrow, transverse, zigzag fasciae at apical third, and a few scattered hairs in the basal region.

Abdomen beneath finely, sparsely punctate, with transverse, crenulate lines, which are coarser on basal segment.

Length, 5 mm; width, 1.75 mm.

Type locality. — Mid Java: Noesa Kambangan Island (Banjoemas Residency).

Type. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type). The type was collected at the type locality, January 8, 1932, by F. C. Drescher, and the paratype was collected at the same locality, November 22 - 30, 1926, by the same collector.

This species is allied to *philippinensis* Saunders, but it differs from that species in having the sides of the pronotum broadly rounded posteriorly, the

lateral carinae arcuate, the surface not so deeply depressed on the basal half, the elytra more acuminate posteriorly, with the tips not distinctly serrulate, and by the different arrangement of the white pubescence on the elytra.

Trachys babakana, new species.

Broadly cuneiform, moderately convex, strongly expanded anteriorly, widest at base of pronotum, strongly shining; above uniformly piceous, with a distinct aeneous or cupreous tinge in certain lights, the elytra ornamented with yellowish pubescent designs; beneath black.

Head with the front broadly, deeply concave between the eyes, when viewed from above broadly, arcuately emarginate, the two median postoral pores distinct and rather narrowly separated; surface feebly, sparsely, irregularly ocellate punctate, sparsely, rather uniformly clothed with long, recumbent, yellowish hairs; eyes acutely margined on inner side, and strongly converging toward the bottom; epistoma slightly elevated, narrow between the antennae, strongly declivous anteriorly, anterior margin concealed by the prosternum, the surface densely reticulate; clypeal suture not distinct.

Pronotum three and one half times as wide as long at middle, considerably narrower at apex than at base, widest near base; sides strongly, arcuately expanded from apical angles to posterior angles, which are acute and produced slightly backward; apical angles acute, extending forward nearly on a line with front of head; anterior margin semicircularly emarginate; base transversely sinuate, the median lobe strongly produced and broadly rounded; disk moderately convex, without distinct depressions; surface feebly ocellate punctate, the ocelli denser toward the sides, sparsely, irregularly clothed with long, recumbent, yellowish hairs, with a few paler hairs intermixed, the hairs denser toward sides. Scutellum small and triangular.

Elytra slightly narrower than pronotum at base, widest at base; sides strongly, obliquely narrowed from humeral angles to near tips, which are conjointly broadly rounded; disk broadly, deeply depressed on each side along lateral margin behind humeral angle, with broad, moderately deep, transverse, basal depressions, and moderately elevated, straight lateral carinae, extending from near the humeri to apices; surface sparsely, irregularly punctate, rather densely clothed with long, recumbent, yellowish and whitish hairs intermixed, the whitish hairs forming two more or less distinct spots on each elytron, one at middle, the other at apical fifth, and with a large glabrous area behind scutellum common to both elytra.

Abdomen beneath moderately convex, feebly granulose, sparsely, irregularly ocellate punctate, the ocelli open posteriorly and denser at sides of basal segment, sparsely clothed with short, recumbent, inconspicuous hairs. Prosternum sparsely, very coarsely ocellate punctate, slightly declivous anteriorly, subtruncate in front; prosternal process slightly elevated, slightly wider than long, sides nearly parallel, broadly rounded at apex. Tarsi black; tarsal lamellae whitish.

Length, 2.75 mm; width, 1.75 mm.

Type locality. — Mid Java: Babakan (Banjoemas Residency).

Type. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type) collected at the type locality, August 1, 1926, by F. C. Drescher.

This species is allied to *lepidoptera* Deyrolle, but it differs from that species in having the front of the head arcuately emarginate, the epistoma narrow between the antennae, the prosternal process with the sides parallel, and in having the pubescence on the elytra more uniform in color.

Trachys kalshoveni, new species.

Broadly oblong, rather strongly convex, moderately expanded anteriorly, widest at base of elytra, strongly shining; above piceous, the head and pronotum with a distinct aeneous reflection, the elytra ornamented with distinct, yellow and white pubescent designs; beneath black.

Head with the front broadly, deeply concave between the eyes, when viewed from above broadly, arcuately emarginate, the two median postoral pores large and rather widely separated; surface indistinctly ocellate punctate, rather densely, uniformly clothed with long, recumbent, golden yellow hairs; eyes acutely margined on inner side, strongly converging toward the bottom; epistoma scarcely elevated, strongly transverse between the antennae, deeply, arcuately emarginate in front, the surface finely, transversely reticulate; clypeal suture not distinct.

Pronotum three times as wide as long at middle, considerably narrower at apex than at base, widest at base; sides arcuately expanded anteriorly, more obliquely expanded posteriorly, the posterior angles nearly rectangular and not produced backward; apical angles acute, extending forward on a line with the middle of the head; anterior margin deeply, arcuately emarginate; base strongly, transversely sinuate, with the median lobe strongly produced and broadly rounded; disk moderately convex, without distinct depressions; surface densely, finely ocellate punctate, densely, uniformly clothed with long, semierect, golden yellow hairs. Scutellum small and triangular.

Elytra slightly wider than pronotum at base, widest at base; sides strongly, obliquely narrowed from humeral angles to near middle, then arcuately narrowed to the tips, which are conjointly broadly rounded; disk broadly depressed on each side along lateral margin behind humeral angle, with broad, shallow, basal depressions, but without lateral carinae; surface sparsely, indistinctly ocellate punctate, rather densely, uniformly clothed with moderately long, erect, black hairs, and each elytron ornamented with long, semierect, white and golden yellow hairs as follows: A large, irregular spot of golden yellow hairs along sutural margin, extending from near scutellum to just behind the middle and laterally to middle of elytron, enclosing an obsolete spot of dark hairs, this yellow spot bordered posteriorly by a transverse, irregular fascia of white hairs,

enclosing anteriorly a round spot of black hairs, and a small spot of white hairs along sutural margin at apex.

Abdomen beneath moderately convex, feebly granulose, coarsely ocellate punctate, the ocelli open posteriorly, and denser at sides of basal segment, sparsely clothed with short, inconspicuous hairs. Prosternum sparsely, coarsely ocellate punctate, sparsely clothed with semierect, whitish hairs, narrowly declivous anteriorly, subtruncate in front; prosternal process slightly elevated, longer than wide, sides arcuately expanded posteriorly, broadly rounded at apex. Tarsi and tarsal lamellae yellowish white, except last tarsal joint, which is black.

Length, 2.75 mm; width, 1.6 mm.

Type locality. — West Java: Mt. Gedeh, Tapos, 800 meters alt. (Buitenzorg Residency).

Type. — In U.S. National Museum, Washington. *Paratypes* in Zoological Museum, Buitenzorg.

Described from three specimens (one type) reared during May 1933 from "tjepaka gondok" collected at the type locality by L. G. E. KALSHOVEN.

This species is allied to *aeneocephalus* FISHER, but it differs from that species in being more acuminate posteriorly, and by the different arrangement of the white and yellow pubescent designs on the elytra.

Trachys batoerradinis, new species.

Broadly oblong, rather strongly convex, about equally rounded in front and behind, widest along basal half of elytra, strongly shining; head aeneous; pronotum, elytra, and body beneath black, the elytra ornamented with white pubescence.

Head with the front broadly, but not very deeply, concave between the eyes, when viewed from above feebly, arcuately emarginate, the two median postoral pores distinct and widely separated; surface rather densely, feebly ocellate punctate, densely clothed with long, recumbent, golden yellow hairs; eyes feebly margined on inner side, strongly converging toward the bottom; epistoma slightly elevated, strongly transverse between the antennae, deeply, arcuately emarginate in front, the surface finely, transversely reticulate; clypeal suture not distinct.

Pronotum three times as wide as long at middle, considerably narrower at apex than at base, widest at base; sides obliquely expanded from apical angles to posterior angles, which are obtusely angulated and not produced backward; apical angles acute, extending forward on a line with the posterior margin of the eyes; anterior margin very broadly, arcuately emarginate; base strongly, transversely sinuate, the median lobe strongly produced and broadly rounded; disk moderately convex, without distinct depressions; surface densely, indistinctly ocellate punctate, densely clothed with long, semierect hairs, which are golden yellow on apical half and white on basal half. Scutellum small and triangular.

Elytra slightly wider than pronotum at base; sides parallel from humeral angles to middle, then strongly, arcuately narrowed to the tips, which are conjointly broadly rounded; disk broadly depressed on each side along lateral margin behind humeral angle, with broad, shallow, transverse, basal depressions, but without lateral carinae; surface coarsely, indistinctly ocellate punctate, densely, uniformly clothed with long, semierect, silvery white hairs, ornamented with a large, postscutellar spot common to both elytra, composed of erect, black, inconspicuous hairs.

Abdomen beneath moderately convex, feebly granulose, coarsely, feebly ocellate punctate, the ocelli open posteriorly and denser at sides of basal segment, sparsely clothed with short inconspicuous hairs. Prosternum feebly ocellate punctate, sparsely clothed with semierect, whitish hairs, narrowly declivous anteriorly, subtruncate in front; prosternal process strongly elevated, longer than wide, sides arcuately expanded posteriorly, broadly rounded at apex. Tarsi yellowish brown, except last joint, which is black; tarsal lamellae yellowish white.

Length, 2.75 mm; width, 1.6 mm.

Type locality. — Mid Java: Mt. Slamat, Batoerraden (Banjoemas Residency).

Type. — In the F. C. Drescher collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type) collected at the type locality, May 1, 1928, by F. C. Drescher.

This species is allied to *pendleburyi* Fisher, but it differs from that species in having the pubescence on the elytra (except on the postscutellar spot) entirely white.

Trachys insulicola, new species.

Broadly oblong, rather strongly convex, moderately expanded anteriorly, widest at base of elytra, strongly shining; above and beneath black, with a distinct aeneous or cupreous reflection, the elytra irregularly clothed with white pubescence, but not forming distinct designs.

Head with the front broadly but not deeply concave between the eyes, with an obsolete, longitudinal, median groove extending from occiput to epistoma, when viewed from above the front very broadly, feebly emarginate, the two median postoral pores distinct and rather widely separated; surface feebly, irregularly ocellate punctate, sparsely, irregularly clothed with long, recumbent, whitish hairs; eyes scarcely margined on inner side, but strongly converging toward the bottom; epistoma not elevated, strongly transverse between the antennae, deeply, arcuately emarginate in front, the surface finely, transversely reticulate; clypeal suture not distinct.

Pronotum two and one half times as wide as long at middle, considerably narrower at apex than at base, widest at base; sides obliquely expanded from apical angles to posterior angles, which are rectangular and not produced backward; apical angles rather acute, extending forward nearly on a line with posterior margin of the eyes; anterior margin very broadly, arcuately emar-

ginate; base transversely sinuate, the median lobe strongly produced and broadly rounded; disk moderately convex, without distinct depressions; surface sparsely, indistinctly ocellate punctate, sparsely, irregularly clothed with long, recumbent, white hairs. Scutellum small and triangular.

Elytra slightly wider than pronotum at base, widest at base; sides feebly narrowed from humeral angles to middle, then strongly, arcuately narrowed to the tips, which are conjointly rather narrowly rounded; disk feebly, broadly depressed on each side behind humerus, but without distinct basal depressions or lateral carinae; surface sparsely, indistinctly ocellate punctate, sparsely, irregularly clothed with long, semierect, white hairs.

Abdomen beneath moderately convex, feebly granulose, coarsely ocellate punctate, the ocelli open posteriorly and denser at sides of basal segment, sparsely clothed with short, inconspicuous hairs. Prosternum feebly ocellate punctate, narrowly declivous anteriorly, subtruncate in front; prosternal process feebly elevated, longer than wide, the sides slightly expanded posteriorly, broadly rounded at apex. Tarsi black; tarsal lamellae whitish.

Length, 2.2 mm; width, 1.38 mm.

Type locality. — Mid Java: Djeroeklegi (Banjoemas Residency).

Type. — In the F. C. DRESCHER collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type) collected at the type locality, November 30, 1930, by F. C. DRESCHER.

This species resembles *mansueta* KERREMANS, but it differs from that species in being more cupreous, more slender, and more strongly acuminate posteriorly, and in having the pubescence sparser and more irregularly distributed on the elytra.

Trachys drescheri, new species.

Broadly oblong, moderately convex, about equally rounded in front and behind, widest at base of elytra, gibbose posteriorly, moderately shining; above black, with a feeble violaceous reflection, and ornamented with whitish and brownish pubescent designs; beneath black, with aeneous or violaceous reflections in certain lights.

Head with the front broadly, deeply concave between the eyes, when viewed from above broadly, arcuately emarginate, the two median postoral pores large and widely separated; surface finely, sparsely ocellate punctate, densely clothed with long, recumbent, golden yellow hairs, and ornamented on each side of occiput with a spot of white pubescence; eyes slightly margined in inner side, and strongly converging toward the bottom; epistoma slightly elevated, strongly transverse between the antennae, deeply, arcuately emarginate in front, the surface finely, transversely reticulate; clypeal suture distinct.

Pronotum nearly four times as wide as long at middle, considerably narrower at apex than at base, widest at base; sides strongly, obliquely expanded from apical angles to posterior angles, which are rectangular but not produced

backward; apical angles acute, extending forward on a line with the posterior margin of the eyes; anterior margin broadly, arcuately emarginate; base transversely sinuate, the median lobe strongly produced and broadly rounded; disk moderately convex, feebly, broadly depressed on each side near lateral margin; surface feebly, irregularly ocellate punctate, sparsely clothed with long, semierect, brownish hairs, the hairs golden yellow at apical angles, and ornamented on each side of middle with a narrow vitta of white hairs extending on a line with the white pubescent spots on the head. Scutellum very small and triangular.

Elytra slightly wider than pronotum at base, widest at base; sides feebly narrowed from humeral angles to middle, then strongly, arcuately narrowed to the tips, which are conjointly broadly rounded; disk uneven, broadly depressed on each side along lateral margin behind humerus, with narrow, transverse, basal depressions, broadly gibbose behind scutellum and near apices, but without lateral carinae; humeri strongly elevated; surface coarsely, feebly ocellate punctate, densely clothed with long, recumbent, black and brown pubescence, and each elytron ornamented with white pubescence as follows: A few scattered hairs in basal depression and behind humeral angle, a transversely oblique spot in front of middle, and a short, narrow, zigzag fascia at apical fourth.

Abdomen beneath slightly convex, feebly granulose, coarsely, densely ocellate punctate, the ocelli open posteriorly and more or less connected on basal segment, sparsely clothed with short, inconspicuous hairs. Prosternum coarsely, sparsely punctate, clothed with a few semierect, yellow hairs, feebly declivous anteriorly, subtruncate in front; prosternal process not elevated, longer than wide, the sides expanded posteriorly, broadly rounded at apex. Tarsi brown, except last joint, which is black; tarsal lamellae brownish white.

Length, 3 - 3.5 mm; width, 2 - 2.3 mm.

Type locality. — West Java: Mt. Gedeh, Tapos, 800 meters alt. (Buitenzorg Residency).

Other locality. — Mid Java: Mt. Slamat, Batoerraden; Babakan (Banjoemas Residency).

Type and paratypes. — In U.S. National Museum, Washington. *Paratypes* in Zoological Museum, Buitenzorg, and the F. C. Drescher collection.

Described from seven specimens (one type). The type and two paratypes were reared during March and April 1933 from "oejah-oejahan" collected at the type locality by L. G. E. Kalshoven; two paratypes were collected at Batoerraden, September 1, 1932, and February 6, 1933, by F. C. Drescher; and two paratypes were collected at Babakan, August 1, 1926, and January 16, 1927, by the same collector.

This species is allied to *corporaali* Obenberger, but it differs from that species in having two longitudinal white pubescent vittae on the pronotum, the elytra clothed with black and brown pubescence, and in having each elytron ornamented with a distinct, transverse, zigzag, silvery white pubescent fascia at the apical fourth.

Endelus morulus, new species.

Rather broadly elongate, strongly attenuate posteriorly, strongly flattened above, strongly shining, uniformly black above and beneath, with a feeble, aeneous reflection.

Head narrower than pronotum, the front broad, subequal in width at top and bottom, broadly, deeply, angularly depressed from epistoma to occiput, the depression extending to the lateral margins, with a large, round, deep puncture on the front in bottom of depression, and a similar, but more elongate puncture behind the epistoma, which is strongly elevated and narrowly constricted between the antennae; surface feebly, finely granulose, with a few obsolete ocellate punctures intermixed; eyes prominent, strongly angulated, placed at the anterior lateral part, which is scarcely projecting; antenna short, serrate from the fifth joint.

Pronotum twice as wide as long, slightly narrower at apex than at base, widest near apex; sides strongly, arcuately expanded in front of middle, then obliquely narrowed to the posterior angles, which are obtusely angulate; anterior margin strongly sinuate, with the median lobe slightly produced and broadly rounded; base transversely truncate on each side to the median lobe, which is slightly produced and broadly truncate in front of scutellum; disk moderately convex, broadly flattened at the sides anteriorly, and with three broad, deep, transverse depressions extending to the lateral margins, one along the base, one at middle, and a shallower one along the anterior margin; surface vaguely granulose, with a few indistinct ocellate punctures intermixed. Scutellum rather large, triangular, the surface finely, densely reticulate.

Elytra distinctly wider than pronotum at base; humeral angles obtusely rounded; sides nearly parallel to just behind middle, then obliquely narrowed to near the tips, which are vaguely expanded, separately broadly rounded, but not distinctly serrulate; disk moderately convex, broadly depressed on each side along lateral margin behind humerus, and with broad, shallow, transverse, basal depressions; surface nearly glabrous, finely, densely granulose, sparsely indistinctly punctate, and more or less feebly rugose basally.

Abdomen beneath feebly, densely granulose, very sparsely, irregularly ocellate punctate, the ocelli open posteriorly.

Length, 3.8 mm; width, 1.5 mm.

Type locality. — Mid Java: Noesa Kambangan Island (Banjoemas Residency).

Type. — In the F. C. DRESCHER collection. *Paratype* in U.S. National Museum, Washington.

Described from two specimens (one type) collected at the type locality by F. C. DRESCHER. The type was collected June 14, 1925, and the paratype June 3, 1928.

This species is allied to *morio* OBENBERGER, but it differs from that species in having the pronotum transversely depressed.

NEUNACHWEIS VON *VIPERA RUSSELLII* AUF JAVA.

Von

HANS NEUHAUS

(Sepandjang-Soerabaja, Java).

Vipera russelii limitis MERTENS.

Senckenbergiana, Bd. 9, Heft 5, 1927, pag. 183 (Endeh, S. Flores).

Es ist recht merkwürdig, dass in einem Lande wie Java, das schon seit langer Zeit gründlich durchforscht ist, eine Giftschlange wie *Vipera russellii* so lange verborgen bleiben konnte.

Zuletzt wurde diese Schlange aus Java im Jahre 1896 von BOULENGER erwähnt. Da sie aber hier nachher nicht mehr gefangen wurde, wurde jener Fund stark in Zweifel gezogen. Trotzdem waren massgebende Herpetologen davon überzeugt, dass *V. russellii* doch noch auftauchen werde, wie z.B. KOPSTEIN in seinem Buche über die javanischen Giftschlangen zum Ausdruck bringt (De Javaansche Gifslangen. Weltevreden, 1930).

Auf dem indischen Festlande fordert der Biss dieser Schlange jährlich viele Todesopfer. Man könnte also annehmen, dass sie auf Java nur sehr selten vorkommt, da bisher kein einziger Bericht über einen durch den Biss dieser Schlange verursachten Todes- oder Krankheitsfall vorliegt. Anderseits kann aber geringe Beisslust und verborgene Lebensweise die Ursache dafür sein, und ist die Schlange auf Java vielleicht gar nicht so selten wie es scheint.

Beschreibung. — ♂. Gefangen am 16. 12. 1933; 0.5 km nördlich vom Dorfe Kloemprik bei Sepandjang, Soerabaja, Ost-Java. Die Gestalt ist dick und gedrungen, der Kopf mässig breit und wenig vom Hals abgesetzt. Rostrale breiter als hoch, mit 6 Schildchen in Berührung. Canthus rostralis deutlich. Schuppen auf dem Kopf klein und stark gekielt. Supraocularia schmal, dazwischen vorne 4, hinten 7 Schuppen. Rund um das Auge [einschl. des Supraoculare] 11 Schuppen. 2 Schuppenreihen zwischen Auge und Supralabialia. Nasenloch in grossem Nasale, vorne an das Nasorostrale, aber nicht an das Supranasale reichend. 4 Sublabialia an das vordere Kinnschild stossend. Äusserste Reihe der Dorsalschuppen glatt, die nächtsfolgende Reihe schwach, alle anderen stark gekielt. Dorsalschuppen in 29-27-21 Reihen. 159 + 1 Ventralia und 49/49 + 1 Subcaudalia.

Grundfarbe grünlich braungrau. Auf dem Rücken eine Längsreihe von 20 dunkel-graubraunen, grossen, ovalen Flecken, welche schwarz, rosa und hellgelb umrandet sind. Kurz vor dem Schwanze und auf demselben fliessen diese Flecke zu einem unregelmässigen Längsband zusammen. Auf den Rumpfseiten eine Reihe von gleich deutlichen, etwa 3/4 mal so grossen, ovalen Flecken von der-

selben Färbung, jedoch mit einem etwas breiteren, hellen Rande. Auf dem Schwanze bilden die lateralen Flecken ein deutliches Längsband. Zwischen der dorsalen und lateralen Fleckenreihe eine Reihe kleiner, länglicher, dunkler Flecke, die auf der Körpermitte am deutlichsten sind, caudal- und cranialwärts aber undeutlicher werden. Unterhalb der lateralen Fleckenreihe eine Serie kleiner, dunkler, zum Teil licht gerandeter Flecke.

Im ganzen sind also 7 dorsale Fleckenreihen vorhanden was für die Zugehörigkeit zur *limitis*-Rasse spricht.

Kopfzeichnung deutlich. Die beiden Flecken auf dem Hinterkopf längsoval. Zwischen den Augen ein undeutlicher, rautenförmiger Fleck, der vorne von einer helleren, nach der Schnauzenspitze zu konvergierenden ⟋◇⟍ Linie begrenzt ist, welche die 3 Flecken auf dem Kopf von der dunkel gefärbten Temporalregion und dem ebenfalls dunklen Canthus rostralis trennt. Diese Linie zeigt dieselbe Färbung wie der Grundton. Der dunkle Subocularfleck ziemlich deutlich. Sublabialia und Sublingualia gelblichweiss mit schwarzen Enden. Ventralia gelblichweiss mit feiner, grauer Punktierung, besonders seitlich. Jedes Ventrale mit 2-3 halbkreisförmigen oder dreieckigen, dunkelgrauen bis schwarzen Flecken. Subcaudalia mit rötlichem Einschlag, ebenfalls fein gesprenkelt, und mit dunkler Medianlinie, die gegen die Schwanzspitze zu verschwindet.

Gesamtlänge 1115 mm; Kopf + Rumpf 970 mm; Schwanz 145 mm.

Bemerkungen. — Diese Otter wurde in einer ziemlich trockenen Landschaft gefangen, nahe einem Wassergraben und ausgestreckten Bambusbüschen. Die in jener Gegend wohnenden Eingeborenen erklärten, noch nie eine solche Schlange gesehen zu haben.

HERPETOLOGISCHE NOTIZEN VII-X [1].

Von

Dr. FELIX KOPSTEIN (Magelang, Java).

VII. Reptilien vom Karimata-Archipel.

In einer kleinen Sammlung Reptilien, welche mir Herr Dr. K. W. DAMMERMAN, Direktor des „Lands Plantentuin" und Zoologischen Museums in Buitenzorg zur Determinierung überliess, befanden sich 3 Schlangen vom Karimata-Archipel. Von dieser, der Westküste Borneos vorgelagerten Inselgruppe (südlich vom Aequator), waren bisher keine Reptilien beschrieben, so dass alle 3 Angaben als neu anzusehen sind.

Bemerkt sei, dass wegen der noch bestehenden Unsicherheit in der Nomenklatur vorläufig jener in DE ROOIJ's „Reptiles of the Indo-Australian Archipelago 1915/17" gefolgt wird, während zwischen Klammern die in den neuen Arbeiten gebrauchten Namen angeführt werden.

Coluber oxycephalus *(Gonyosoma oxycephala)*

1 ad.; Karimata-Archipel; III. 1931.

Lg. 166 cm; Sq. 25; V. 245 + 1/1; Sc. 125; 9 Supralabialia, das 5. + 6. unter dem Auge; 5 Sublabialia in Kontakt mit den vorderen Kinnschildern.

Simotes purpurascens *(Oligodon purpurascens)*

1 juv.; Poeloe Seroetoe; 25. III. 1931.

Lg. 22 cm; Sq. 19; V. 177 + 1; Sc. 49/49 + 1; 2 Prae-, ø Sub- und 2 Postocularia; Temporalia 2-3; Supralabialia 8, das 4. + 5. unter dem Auge.

12 dunkle Querbänder auf der Rückenseite, dazwischen 3-5 dunklere Linien eben angedeutet.

Lachesis wagleri *(Trimeresurus wagleri wagleri)*

1 s.ad.; Poeloe Panebangan; 20. III. 1931.

Lg. 53 cm; Sq. 21-19-17; V. 149 + 1; Sc. 53/53 + 1; Rostrale eben so breit wie hoch; Supraoculare schmal; Internasalia deutlich; 9-10 Schuppen zwischen den Supraocularen; 2 Postocularia; 10 Supralabialia; das Suboculare durch 1 Schuppenreihe von den Supralabialen getrennt, nicht in Kontakt mit dem 3. Supralabiale.

Oben einfärbig blaugrün (Alkohol!); auf der distalen Körperhälfte 2 Reihen wenig auffallender, weisser Punkte; seitliche Schuppenreihen etwas lichter; Unterseite einfärbig blassgrün; Schwanzspitze braun. Vom hinteren Rande des Nasale zieht ein brauner, oben weisslich gesäumter Streifen über den Canthus rostralis, die Postocularia zur Temporalgegend und endet einige Schuppenreihen

[1] Cfr. Treubia, Vol. X, p. 467; Vol. XI, p. 301; Vol. XII, p. 273; Vol. XIII, p. 1; Vol. XIV, p. 73 und 78.

oberhalb und hinter den Mundwinkeln. Die Breite dieses Streifens beträgt 1-2 Schuppen.

Dieses Exemplar vertritt vielleicht eine eigene Rasse, welche Frage aber erst durch die Aufsammlung von mehr Material von diesen Inseln zu beantworten sein wird.

VIII. Reptilien von der Insel Boeton.

Vor einiger Zeit erhielt ich von Boeton eine kleine Kollektion Reptilien, welche Herr Dr. REELING KNAP im Jahre 1931 in der Umgebung des Hafenortes Baoe-Baoe sammelte. Trotz der sehr schlechten Konservierung sollen die vorhandenen Exemplare hier behandelt werden, weil die meisten einen Neunachweis für diese Insel darstellen. Die mit einem *) versehenen Arten sind zum erstenmal von Boeton nachgewiesen.

Python reticulatus

1 juv. ohne Kopf; Lg. ± 80 cm; Sq. 81 + 1; Sc. 92/92 + 1.

Psammodynastes pulverulentus *

1 ad.; Lg. 42 cm; Sq. 17; V. ?; A. 1; Sc. 52/52 + 1; 1 Prae-, 3 Postocularia; Temporalia 2 + 2.

Im Mageninhalt eine *Mabuia rudis*.

Dryophis prasinus *(Passerita prasina, Ahaetulla prasina)*

1 ad.; Lg. 118 cm; Sq. 15; V. 214 + 1/1; Sc. 203/203 + 1; Internasalia durch ein schmales Loreale von den Supralabialen getrennt; 3 Lorealia; Temporalia 2 + 3.

Lachesis wagleri * *(Trimeresurus wagleri wagleri)*

1 s. ad.; Lg. ± 50 cm; Sq. 23; V. ?; A. 1; Sc. 48/48 + 1; Supraoculare links vorhanden, rechts in kleine Schuppen aufgelöst; Internasalia vorhanden; 12 Schuppen zwischen den Supraocularen; Supralabialia 10.

Lycodon aulicus *

1 ad.; Lg. 41 cm; Sq. 17; V. 198 + 1/1; Sc. 68/68 + 1; Supralabialia 8.

Der untere Teil der Supralabialia dunkel pigmentiert, die obere Partie weiss Die dunkle Färbung der Kopfoberseite greift auf den oberen Rand der Supralabialia über.

Es lässt sich vorläufig nicht entscheiden, ob dieses Stück der *capucinus*-Rasse zuzurechnen ist.

Oligodon waandersi *

1 juv.; Lg. 22 cm; Sq. 15; V. 152 + 1/1; Sc. 18/18 + 1; kein Loreale; 1 Prae-, 1 Postoculare; 6 Supralabialia, das 3. + 4. unter dem Auge.

Cylindrophis rufus *

1 s. ad.; Lg. 50 cm; Sq. 21; V. 172 + 1/1; Sc. 6 + 1; Schnauze des Alkoholpraeparates licht gelb (Rostrale, Nasalia, die vorderen 2/3 der Praefrontalia, das 1., 2. und die vordere Hälfte des 3. Supralabiale). Sonst ist die Oberseite

des Kopfes und die Rückenseite des Rumpfes irrisierend blauschwarz. Von der Kopfoberseite zieht ein dunkles Band über das Auge, das 3. und 4. Supralabiale zum Mundrand. Das vordere Temporale, das 5. und zum Teil auch das 4. Supralabiale, und die Ränder der anstossenden Schuppen hell gelb. Die Unterseite des Kopfes hellgelb mit einer ⅄ förmigen, schwarzen Zeichnung, welche hinter dem Mentale, auf der Sutur des 1. Sublabialpaares beginnt und hinter den Mundwinkeln auf die Kopfoberseite zieht.

Die weitere Färbung und Zeichnung liegt innerhalb der normalen Variationsbreite der javanischen Exemplare.

Morphologisch scheint die Schnauze dieses Boeton-Stückes breiter und stumpfer zu sein als bei javanischen *C. rufus*, doch lässt sich an der Hand dieses einen Exemplares nicht feststellen, ob es sich um eine eigene Inselrasse handelt.

Mabuia rudis *

1 ex.; Sq. 32.

Aus dem Mageninhalt von *Psammodynastes pulverulentus.*

IX. Reptilien von Benkoelen.

Die hier beschriebene kleine Reptilien-Kollektion wurde im Dezember 1930 von Fräulein SAMUELSON in der nächsten Umgebung von Benkoelen, einem Hafenort an der Westküste von Sumatra, unter dem Aequator, angelegt. Da jede Sammlung aus diesem Gebiete geeignet ist, unsere ökologischen und morphologischen Kenntnisse der Herpetofauna zu vermehren, seien hier die gemachten Funde mitgeteilt.

Tropidonotus piscator *(Natrix piscator)*

1 ad.; Lg. 98 cm; Sq. 19; V. 136 + 1/1; Sc. 86/86 + 1. 1 Prae-, 4 Postocularia; Temporalia 2 + 3; 9 Supralabialia, das 4., 5. und 6. berühren das Auge. Die letzte, stellenweise die beiden letzten Schuppenreihen glatt.

Die schwarzen Flecken bilden undeutliche Querbänder. Seitlich auf dem vorderen Drittel leuchtend rote Flecke, welche auf dem Halse ± 10 Schuppen umfassen, caudalwärts aber kleiner werden.

Tropidonotus trianguligerus *(Natrix trianguligera)*

Länge in cm	Sq.	V.	Sc.	Vordere Temporalia		Praeocularia		Postocularia		Supralabialia
				l.	r.	l.	r.	l.	r.	
88	19	138+1/1	94/94+1	1	2	1	1	3	3	9
87	19	139+1/1	83/83+1	1	1	1	1	4	3	9
75	19	138+1/1	90/90+1	2	2	1	1	3	4	9
70	19	136+1/1	87/87+1	2	2	1	1	3	3	9
65	19	136+1/1	90/90+1	2	2	1	1	3	4	9
61	19	138+1/1	—	2	2	1	1	3	3	9
42	19	137+1/1	89/89+1	2	2	1	1	4	4	9

Die letzte, stellenweise die beiden äusseren Schuppenreihen glatt. Die dunklen Dreiecksflecke werden mit zunehmendem Alter weniger deutlich. Rötliche Zwischenräume angedeutet.

Tropidonotus chrysargus *(Natrix chrysarga)*

1 s. ad.; Lg. 43 cm; Sq. 19; V. 149 + 1/1; Sc. 81/81 + 1; 1 Prae-, 4 Postocularia; Temporalia 2 + 3; 9 Supralabialia, das 4.-6. unter dem Auge.

Auf jedem Parietale ein gelber, dunkel gesäumter Punkt.

Tropidonotus conspicillatus *(Natrix conspicillata)*

1 ad.; Rumpflänge 37 cm (Schwanzspitze abgebrochen); Sq. 19; V. 139 + 1/1. Letzte Schuppenreihe schwach gekielt.

Dryophis prasinus *(Passerita prasina, Ahaetulla prasina)*

1 ad.; Lg. 107 cm; Sq. 15; V. 214 + 1/1; Sc. 175/175 + 1; Loreale rechts 3, links 2. Schuppen der Sacralregion schwach gekielt.

Chrysopelea ornata

1 s. ad.; Lg. 55 cm; Sq. 17; V. 224 + 1/1 + 1/1; Sc. 123/123; Loreale nicht mit dem Praefrontale vereinigt; das Praeoculare nicht in Kontakt mit dem Frontale; 9 Supralabialia, das 4.-6. unter dem Auge; einzelne Schuppen sehr schwach gekielt.

Oben schwarz; jede Schuppe mit einem runden, grünlichen Fleck (Alkohol!); eine Dorsalreihe von 3-5 (meist 4), in Gruppen angeordneten, runden Flecken; die kleineren seitlichen Flecke in parallelen Schrägreihen.

Dendrophis pictus *(Dendrelaphis pictus pictus, Ahaetulla picta)*

1 ad.; Lg. 95 cm; Sq. 15; V. 175 + 1/1; Sc. 136/136 + 1; Temporalia 1 + 1; 9 Supralabialia, das 4.-6. unter dem Auge.

Dendrelaphis caudolineatus

1 juv.; Lg. 40 cm; Sq. 13; V. 179 + 1/1; Schwanzspitze abgebrochen.

Naja tripudians sumatrana *(Naja naja sumatrana)*

1 ad.; Lg. 104 cm; Sq. 21-21-17; V. 188 + 1; Schwanzspitze abgebrochen.

Sutur der Internasalia 1/2 mal so lang als jene der Praefrontalia; Frontale ebenso lang als seine Entfernung vom Rostrale, breiter als das Supraoculare; 1 Prae-, 3 Postocularia; Temporalia 2 + 3; 4 Infralabialia berühren das vordere Kinnschild.

Oberseite schwarzbraun; auf dem letzten Drittel 5 (6) hellgelbe Ringe (Alkoholpraeparat!), die ventral ungefähr doppelt so breit sind wie dorsal. Auf dem Schwanze 2 gelbliche Ringe angedeutet. Eine Brillen-ähnliche Zeichnung auf dem Nacken fehlt. Unten dunkel grauschwarz, mit den bereits erwähnten gelben Ringen; Kehle hellgelb mit einem symmetrischen, nicht konfluierenden, schwarzen Fleckenpaar; vor diesem medial ein dunkler Fleck; das Gelb des Halses durch ein schwarzes Band vom dunklen Grau der Bauchseite abgegrenzt;

die lichte Kehlfärbung vom Braun des Nackens durch eine schwarze Linie geschieden.

X. Weitere Beobachtungen über die Fortpflanzung west-javanischer Reptilien.

In Anschluss an die Bildserien javanischer Reptilieneier in Treubia XI, 3, 1930 und XIV, 1, 1932 seien hier einige weitere Beobachtungen mitgeteilt. Die folgenden Photographien von Schlangeneiern sind in natürlicher Grösse dargestellt und wurden innerhalb 24 Stunden nach der Ablage genommen.

Dipsadomorphus dendrophilus *(Boiga dendrophila)* (Pl. 1, fig. 1)

Ein im April 1931 bei Cheribon gefangenes ♀ legte am 22. V. in Bandoeng 6 Eier, welche 50 × 25, 48 × 25, 45.5 × 24.5, 51 × 25, 50.5 × 25, 50.5 × 24.5 massen. Die einfärbig weissen Eier besassen eine sehr feste, pergamentähnliche Schale mit zahlreichen, längsverlaufenden, feinen Rillen. Das ♀ lag zusammengerollt um die Eier herum, liess diese aber ruhig wegnehmen. Im Laufe der Entwicklung veränderten die Eier, so wie dies gewöhnlich der Fall ist, ihre Form und massen am 16. VIII. 50 × 27.5, 51.5 × 25.5, 49 × 28, 47 × 27.5 mm. Die jungen Schlangen kamen am 16. VIII. 1931 aus — also nach 86 Tagen — und hatten eine Länge von 36 cm.

Calamaria virgulata (Pl. 1, fig. 2, 3)

Ein im Juni 1931 bei Rantjabali (Südlich von Bandoeng), in ± 1700 m Höhe gefangenes ♀ legte am 26. VI. in Bandoeng 3 Eier von 30 × 8.5, 26 × 8 und 27 × 8 mm. Ein anderes ♀ legte am 28. VI. 2 Eier von 32 × 7 und 31 × 7 mm und zwei Tage später noch ein Ei von 34.5 × 7 mm.

Am 30. VI. 1931 legte ein weiteres ♀ 3 Eier von 27 × 7.5, 27 × 7 und 31.5 × 7.5 mm. Die Eier von *Calamaria virgulata* sind, wie die Abbildungen 2 und 3 demonstrieren, unregelmässig in Form und Grösse und sehr weichschalig. Keines der oben beschriebenen Eier kam aus.

Amblycephalus carinatus (Pl. 1, fig. 4)

Ein am 19. Februar 1934 bei Nandjoeng Djaja (Tjibatoe), in ± 700 m Höhe gefangenes ♀ legte am 23. III. in Magelang (Mittel-Java) 3 Eier von 23 × 10, 22 × 9.5 und 23 × 10 mm. Die Eier von *A. carinatus* sind nach der Ablage blendend weiss und mit einer festen, pergamentartigen Schale bedeckt.

Am 30. III. wurden in einem hohlen Baumstamm 6 Eier gefunden, die hier bereits einige Zeit lagen. Aus diesen Eiern kamen am 4. V..... 6 Schlangen aus, welche 36 Stunden nach der Geburt 155, 160, 165, 165, 170 und 170 mm massen.

Am 26. IV. 1934 wurden 6 weitere Eier gefunden, welche 21 × 10, 23 × 10, 23 × 9, 22 × 10, 21 × 10 und 22 × 9 mm massen.

Bungarus fasciatus

Ein am 12. VIII. 1931 bei Indramajoe getötetes ♀ enthielt 11 beinahe legereife Eier.

Calotes tympanistriga

2 Eier unter Moos gefunden am 6. IX. 1932 bei Tjibodas (Gedeh), in ± 1400 m Höhe.

Naja tripudians sputatrix *(Naja naja sputatrix)*

Am 1. X. 1931 erhielt ich von Herrn Dr. H. C. DELSMAN 2 *Naja naja sputatrix* ♀♀ von 120, resp. 153 cm Länge, welche in Kemajoran (Batavia) in einem Erdloch gefangen wurden. Aus derselben Höhle wurden ungefähr 30 Eier hervorgeholt. Diese waren in 2 verschiedenen Klumpen miteinander verklebt. An beiden ♀♀ war deutlich zu erkennen, dass sie kurz zuvor Eier gelegt hatten, so dass wir mit sehr grosser Wahrscheinlichkeit annehmen dürfen, dass die beiden *Naja* ♀♀ zu den in der Höhle gefundenen Eiern gehörten. Dieser Fund bestätigt die früheren Beobachtungen, welche dahin weisen, dass bei *Naja naja sputatrix* eine Art von Brutpflege besteht. Besonders merkwürdig ist hier die Wahrnehmung, dass 2 ♀♀ ihre Eier gemeinsam in e i n e r Höhle ablegten und vielleicht auch bewachten!

Von den ± 30 Eiern wurde ein Teil beim Ausgraben vernichtet. Die übrig gebliebenen massen 40 × 29, 45 × 30, 40 × 28, 38 × 29 und 42 × 28 mm. Die Schalen waren sehr weich, dünn und kaum pergamentartig.

Von diesen Eiern kamen bloss zwei aus, u. zw. am 22. XII. 1931.

Tropidonotus chrysargus *(Natrix chrysarga)*

Am 18. VI. 1931 fand ich bei Rantjabali (südlich von Bandoeng), in ± 1700 m Höhe, unter faulendem Laub 2 Eiklumpen, von denen jedes aus 10 Eiern bestand. Sie massen:

1) 33.5 × 20, 30.5 × 19, 30 × 18, 34 × 20.5, 30 × 18, 33 × 19, 33 × 18.5, 31 × 20, 31 × 21 und 32 × 20 mm.

2) 23 × 16, 25.5 × 16, 24 × 17, 19.5 × 16, 24 × 17, 23 × 16.5, 26 × 17, 21 × 15.5, 20 × 15, 23 × 17 mm.

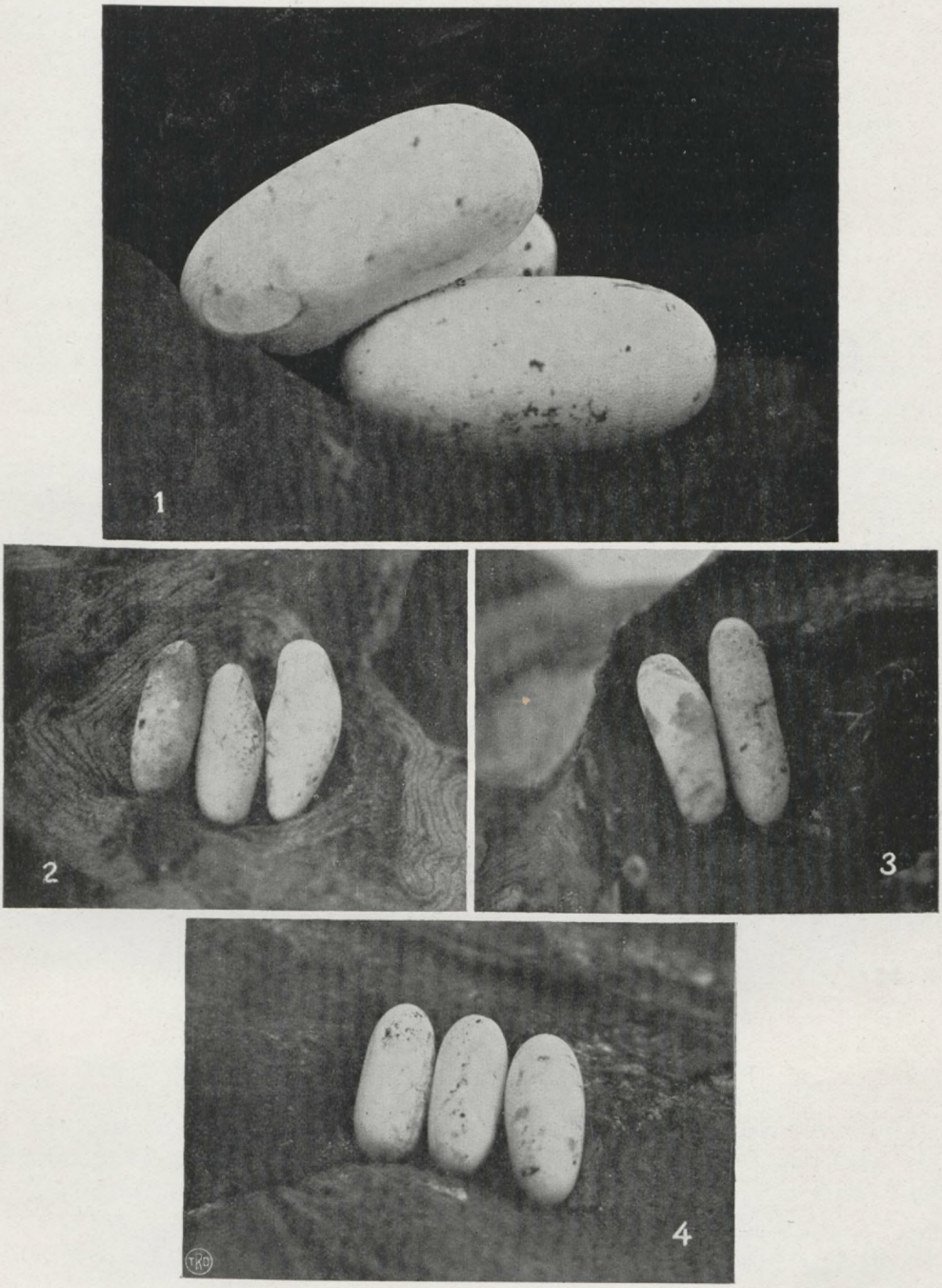
Die Eier zeigten eine feste, pergamentähnliche Schale.

Von der 1. Gruppe kamen am 28. VI..... 5 Schlangen aus, welche 197-208 mm lang waren.

Bei der 2. Gruppe kamen am 16. VIII. 1931 alle 10 Eier aus. Die neugeborenen Schlangen massen 210-220 mm.

Zamenis korros *(Ptyas korros)*

Ein am 4. X. 1931 in Bandoeng getötetes ♀ enthielt 6 legereife Eier.



F. KOPSTEIN: Herpetologische Notizen X.

Fig. 1. *Dipsadomorphus dendrophilus*. — Fig. 2-3. *Calamaria virgulata*. — Fig. 4. *Amblycephalus carinatus*.

NEUE AMEISEN AUS DEM INDO-AUSTRALISCHEN GEBIET, nebst Revision einiger Formen.

Von

W. KARAWAJEW (Kiew).

Den grössten Teil des Materials, welches der vorliegenden Arbeit zu Grunde liegt, verdanke ich meinem langjährigen Freund und Landsmann Dr. K. N. Davydov (vormaligem Forschungsreisenden auf den Inseln von Niederländisch-Indien, damals Zoologe an der Akademie der Wissenschaften in Leningrad, jetzt Zoologe an der Station Maritime de l'Institut Océanographique de l'Indochine in Caûda, par Nhatrang, Cochinchine in Annam), [1]) welcher die Güte hatte Ameisen für mich in den Jahren 1930 und 1931 in Annam und auf den anliegenden kleinen Inselchen zu sammeln. Ich fühle es als meine angenehme Pflicht ihm dafür auch an dieser Stelle herzlich zu danken. Es ist mir noch weiteres Sammeln von Material, auch von weiter entlegenen kleinen Inseln der Chinesischen Südsee, versprochen.

Von dem erhaltenen Material bleiben noch einige *Pheidole* und *Camponotus* wegen Mangel an Literatur und Vergleichsmaterial unbestimmt.

Das Material wurde nur flüchtig nebenbei gesammelt und dessen ungeachtet enthält es eine grosse Reihe neuer Formen. Das soll uns doch nicht wundern, denn in den genannten Gebieten wurden Ameisen noch fast garnicht oder garnicht gesammelt.

Zu diesem Material gesellt sich noch etwas von dem Material, welches ich selbst auf meiner Reise nach den Inseln von Niederländisch-Indien im Winter von 1912-13 gesammelt und bislang noch nicht bearbeitet hatte [2]). Ein Paar Formen sind noch von meinem Landsmann O. John.

Subfam. PONERINAE.

Stigmatomma amblyops sp. n. (Abb. 1).

☿. Kopf meiner Exemplare 1,07 mal so lang wie breit, in der vorderen Hälfte parallelseitig, in der hinteren sich allmählich verjüngend, mit abgerundeten Hinterecken und kaum konkavem Okzipitalrand. Die Vorderecken des Kopfes bei Frontalansicht wie in zugespitzte Zipfel ausgezogen. Der Vorderrand

[1]) Vergl. dessen Schriften: Vorläufiger Bericht über die Reise nach Java und anderen Inseln des Malayischen Archipels (russisch). Bull. Acad. Sciences de St. Pétersbourg, Bd. XVIII, 1903.
Auf den Inseln des Indo-Australischen Archipels. Eindrücke und Beobachtungen eines Naturforschers. Auf der Insel Java. Ibidem, Bd. XXI, 1904.
Auf den Inseln etc. Der Molukken-Archipel. Ibidem, Bd. XXII, 1905.
Auf den Inseln etc. Auf den Aru-Inseln. Ibidem, Bd. XXV, 1906.

[2]) Vgl. meine Schriften, welche in der Konowia, Bd. XI, 1932, p. 305 angegeben sind, sowie solche in den nächsten Lieferungen dieser Zeitschrift.

des Clypeusrandes gerade, mit 6 flachen, an der Spitze abgerundeten, Zähnchen, von denen die 4 mittleren klein, die 2 äusseren viel grösser sind. Die Stirn ist ziemlich schmal, wie bei den südamerikanischen Arten und von Neu-Seeland, stark eingeschnürt, mit wohlausgebildeten Lappen. Das dreieckige glänzende Stirnfeld ist eingesenkt und von demselben an erstreckt sich nach hinten bis etwa über die halbe Kopflänge die mediane Linie, welche mit einem Punkt (Rudiment der vorderen Ocelle?) endet. Der Scapus erstreckt sich bis auf ⅔ der Kopflänge. Die distale Hälfte des Funiculus wird gegen die Spitze allmählich, aber rasch, breiter. Augen ganz atrophisch, punktförmig, eingesenkt, etwas hinter der halben Kopflänge gelegen (bei Frontalansicht des Kopfes kann man sie kaum unterscheiden). Mandibeln mit einer teilweise doppelten Zahnreihe; an der Basis desselben befindet sich je ein sehr breiter Zahn.

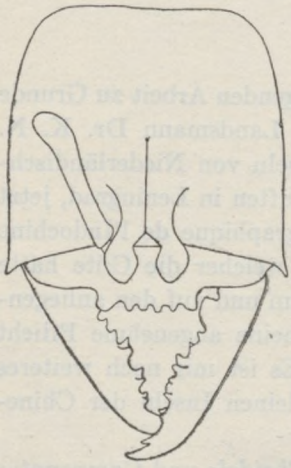


Abb. 1. — *Stigmatomma amblyops*, sp. n. ♀.

Der vordere, verjüngte, Abschnitt des Petiolus äusserst kurz, so dass die vordere senkrechte Fläche desselben fast unmittelbar bis zur Artikulation abfällt; das Rückenprofil des Petiolus, bis zum glatten hinteren Rand, beinahe geradlinig.

Kopf mit dichten, kleinen, eingesenkten, haartragenden Punkten (die Härchen äusserst kurz), auf der Stirn dazwischen eine feine Längsstrichelung, matt; Clypeus längsgestrichelt, etwas glänzend; Stirnfeld sehr glatt und glänzend; Mandibeln schief längsgestrichelt, glänzend. Pronotum mit dichten kleineren haartragenden Punkten, halbmatt. Meso- und Epinotum oben unregelmässig haartragend punktiert, gleich den seitlichen längsgestrichelten Teilen dieser Abschnitte ziemlich glänzend; ein Medianstreifen auf der Basalfläche des Epinotums und dessen abschüssige Fläche sehr glatt und glänzend. Petiolus und Postpetiolus spärlicher haartragend punktiert, glänzend. Die Gaster nur auf der Oberseite des 1. Ringes etwas punktiert, übrigens sehr glatt und glänzend, hauptsächlich oben mit halbabstehenden Haaren, welche gegen die Spitze länger werden. Kopf und Thorax rötlich dunkelbraun. Stielchenglieder und Gaster rötlichbraun, gegen die Spitze gelblichbraun; Fühler, Mandibeln und Beine gelblichbraun. — L. mit ausgestrecktem Kopf und Mandibeln etwa 6 mm, Kopflänge 1,05, Kopfbreite 0,98, Scapus 0,52, Funiculus etwa 1,0 (gebogen gemessen), minimale Stirnbreite 0,17, Mandibeln 0,8, Thorax 1,4 mm.

Caûda, Cochinchine, K. DAVYDOV, Nr. 5675, 2 ♀.

Stigmatomma quadratum sp. n.

♀. Kopf gleich lang wie breit, mit kaum gewölbten parallelen Seiten, nur ganz hinten, von den kaum hinter der halben Kopflänge gelegenen Augen an, etwas verjüngt; die Hinterecken abgerundet und der Okzipitalrand bei richtiger Einstellung beinahe ganz gerade, kaum konkav. Der Längsdurchmesser der

eiförmigen Augen 0,21 mm. Der Vorderrand des Clypeuslappens schwach bogenförmig gewölbt, mit winzigen Zähnchen, die nur bei einer stärkeren Vergrösserung gut unterscheidbar sind. Das Vorderende der Kopfseiten, welches an die seitlichen Abschnitte des Clypeus grenzt, bei Frontalansicht des Kopfes als kleine parallelseitige, etwas nach aussen gerichtete, Zäpfchen hervorragend. Der Scapus den Okzipitalrand um etwa die Hälfte seiner Länge nicht erreichend. Stirnleisten weit voneinander stehend, parallel, nur ganz hinten auseinander gebogen, so lang wie ⅓ der Kopflänge; von dem Hinterrand des Clypeus (das Stirnfeld ist nicht unterscheidbar) an zieht sich eine mediane Linie, welche immer feiner wird, sich aber doch beinahe bis zum Okzipitalrand erstreckt. Mandibeln mit einer doppelten Zahnreihe, die etwa wie bei *S. rothneyi* beschaffen ist (eine genauere Angabe kann ich nicht geben, da die Zähne teilweise abgebrochen sind).

Die breit bogenförmigen Seitenkanten der abschüssigen Fläche des Epinotums sind erhaben und dabei abgerundet. Der vordere verjüngte Abschnitt des Petiolus recht entwickelt; das Rückenprofil des Petiolusknotens bis zum hinteren glatten Rand deutlich konvex.

Kopf mit dichten haartragenden Punkten und dazwischen äusserst fein längsgestreift; ausser den genannten haartragenden Punkten zwischen der Strichelung noch eine feinere Punktierung; der mittlere Abschnitt des Clypeus fein längsgestreift, die Seiten viel gröber gestreift. Mandibeln ziemlich scharf längsgestreift, glänzend. Der Kopf ist im allgemeinen matt. Pronotum mit viel kleineren dichten haartragenden Punkten. Mesothorax und die Seiten des Epinotums äusserst fein der Länge nach punktiert, oben, sowie an der abschüssigen Fläche des letzteren, mit gröberen haartragenden Punkten, die Seiten des Epinotums oberhalb des Stigma ausserdem mit spärlichen grossen Punkten. Der gesamte Thorax, sowie der Petiolus, der unregelmässig punktiert ist, matt. Postpetiolus kaum weniger scharf punktiert, kaum glänzend. Auf dem 1. Gasterring verschwindet die Punktierung fast ganz und auf dem folgenden ist davon schon keine Spur, wobei die Gaster glatt und sehr glänzend wird. Der Kopf sehr kurz, der übrige Körper viel länger, der Thorax besonders oben, behaart, die Seiten des Epinotums beinahe ohne Haare; gegen die Spitze der Gaster werden die Haare besonders lang, dabei aber viel spärlicher. Tief dunkel braun, die Fühler, Mandibeln, Beine und Spitze der Gaster rötlich. — L. mit ausgestrecktem Kopf und Mandibeln etwa 9 mm; Kopflänge 1,68, Kopfbreite 1,57, Stirnbreite 0,25, Scapus 0,98, Funiculus 1,85, Mandibeln 1,5, Thorax 2,31 mm.

Poulo Dama, Archipel im Golf von Siam, südlich von der Insel Phuquoe, K. Davydov, Nr. 5673, 1 ☿.

Proceratium longigaster sp. n. (Abb. 2).

☿. Kopf herzförmig, mit kaum konkavem Okzipitalrand, gleich lang wie breit, vorn viel schmäler wie hinten. Mandibeln vorn mit deutlichen langen Zähnen, die allmählich kleiner und undeutlicher werden. Der Scapus ist ⅔ der Kopflänge gleich; der Funiculus 1,4 mal so lang wie der Scapus; dessen Glieder,

mit Ausnahme des 1. und letzten, deutlich breiter wie lang. Augen punktförmig, etwas vor der Mitte der Kopflänge gelegen.

Thoraxprofil vorn stark gewölbt. Der Uebergang der Basalfläche des Epinotums in die abschüssige ziemlich deutlich durch einem stumpfen Winkel markiert; beiderseits davon je ein winziges spitzes dunkles Zähnchen, welches oberhalb und unterhalb in eine scharfe dunkle Kante übergeht. Petiolus in Form einer dicken Schuppe, welche unten dicker ist, oben abgerundet und daselbst doppelt so breit wie dick (lang) ist, sie ist hier so breit wie der Abstand der Epinotumdornen von einander; unten ist der Petiolus mit einem nach hinten gerichteten gut entwickelten Haken versehen. Postpetiolus etwas höher wie lang. Der erste Gasterring beinahe 1,7 mal so lang wie der Postpetiolus. Die 3 letzten Gasterringe besonders lang, zusammen beinahe so lang wie der erste Ring.

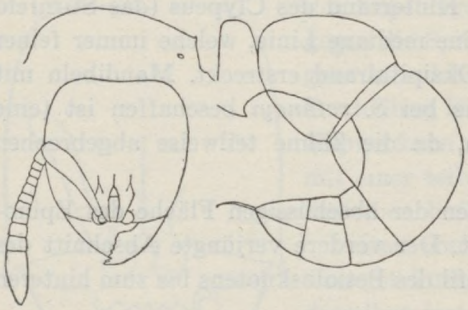


Abb. 2. — *Proceratium longigaster*, sp. n. ♀.

Fein und dicht gleichmässig punktiert, durchaus matt. Mit spärlichen abstehenden und dichten anliegenden weisslichen Haaren. Dunkel rötlich-ockerfarben, die drei letzten Gasterringe gelblich. — L. 2,5 mm.

Durch die Epinotumbewaffnung *P. lombokense* EM. ähnlich, unterscheidet sich aber von dieser Art sehr durch andere Merkmale. Das ist die erste Art, welche auf dem eurasischen Kontinent gefunden ist. Einige andere Arten bekannt für Nordamerika und Neuguinea.

Bana, 1400 m, bei Tourane, Zentralannam, 30. IX. 1931, K. DAVYDOV, Nr. 5663, 1 ♀.

Odontoponera transversa SM.

Phu-Ho, Provinz Phu-Tho, Tonkin, K. DAVYDOV, Nr. 5669, 2 ♀. — Ban-Me-Thuot, 700 m, Prov. Danlak, Südannam, an der Grenze mit Cambodge, 30. VI. 1930, Derselbe, Nr. 5734, 1 ♀. — Lien-Cheû bei Tourane an der Basis von Col de Nuage, Zentralannam, Sept. 1931, Derselbe, Nr. 5635, 2 ♀. — Loeninch, Nordcochinchine, an der Grenze von Cambodge, 10. XII. 1931, Derselbe, Nr. 5670, 3 ♀. — Poulo Condore, Archipel südlich von Saigon, IV. 1930. Derselbe, Nr. 5659, 1 ♀.

Für die Malayische Halbinsel, die Malayischen Inseln und Philippinen bekannt.

Diacamma rugosum rugosum LE GUILL. var. **arcuata** KAR.

D. rugosum LE GUILL. subsp. *arcuata*: KARAWAJEW, Konowia, Bd. 4, 1925, p. 118.

In der systematischen Einteilung der *rugosum*-Gruppe halte ich mich an EMERY (Rend. Sess. Accad. Sci. Ist. Bologna, 1896-97, p. 164), betrachte aber

diese Einteilung als eine provisorische. Eine den verwandtschaftlichen Beziehungen entsprechendere Einteilung ist nur auf Grund eines sehr umfangreichen Materials aus verschiedenen Gegenden zu bauen, auf ein baldiges Zusammenbringen eines solchen ist aber nicht zu hoffen.

♀. Diese Varietät unterscheidet sich von der Nominatrasse dadurch dass die Pronotumrunzeln bei derselben nicht bogenförmig-longitudinal, wie das Emery für *rugosum* (vgl. obige Arbeit, p. 164 und Taf., Fig. 4) angibt und abbildet, verlaufen, sondern breit hufeisenförmig. Damit will ich sagen dass die Schleifen vorn halbkreisförmig sind und dann, schwach bogenförmig gewölbt, konvergent zu der Promesonotum-Naht verlaufen.

Ich mache einige Zusätze zu meiner früheren Beschreibung in der Konowia.

Der Abstand der Spitzen der an der Basis verbreiterten, spitzen, kaum divergenten, Petiolusdornen von einander beträgt 0,38 mm, der Abstand der Linie, welche die Spitzen der Dornen mit einander verbindet, bis zum Grund der Ausbuchtung — 0,28 mm. Die gut ausgeprägten Runzeln auf dem oberen ⅓ des Mesosternits verlaufen quer zu seinem Längsdurchmesser, die übrigen schief. Die abstehenden Haare sind spärlich, die anliegende Pubeszenz reichlich aber kurz. Die Grundfarbe des Körpers ist beinahe schwarz, die Pubeszenz etwas gelblich. — L. 9,5 mm, Thoraxlänge 3,75 mm.

Ausser dem Exemplar von Manguinang, Sumatra, welches mir als Typus für die Aufstellung von *arcuata* diente, besitze ich jetzt noch 3 Exemplare, 2 aus Annam und 1 von dem Archipel Poulo Dama im Golf von Siam, welche sich ziemlich an die Merkmale des Typus anschliessen, indessen aber doch kleine Unterschiede aufweisen. Vorläufig, da es nur einzelne Exemplare sind, beschränke ich mich nur auf eine kurze Beschreibung deren Merkmale.

Die Runzel, welche den postero-medialen Augenrand berührt, verläuft bei den annamitischen Exemplaren und dem Exemplar von Poulo Dama kaum ausserhalb der Artikulation der Antenne (bei dem sumatranischen Exemplar sehr deutlich ausserhalb). Bei Betrachtung des Pronotums von oben sieht man hinten eine konzentrische Runzelung aus 2-3 Runzeln (bei dem Exemplar von Bokkor etwas ungleichmässiger), welche von einem breiten hufeisenförmigen System von Runzeln umgeben wird. Die Runzelung auf dem Mesosternit ist bei dem Exemplar von Poulo Dama schief orientiert, wobei die Runzeln in derselben Richtung wie auf dem Metasternit und Epinotum verlaufen, im Gegenteil, bei dem Exemplar von Bokkor verlaufen sie ungefähr quer zu dessen Längsdurchmesser. Petiolusdornen lang, dünn, spitz, sehr divergent, an der Basis schwach verbreitert. Der Abstand deren Spitzen von einander: Poulo Dama — 0,49 mm, Bokkor — 0,63, der Abstand der Linie, welche die Spitzen verbindet, vom Grund der Ausbuchtung: Poulo Dama — 0,32, Bokkor — 0,21 mm.

Die reichlich entwickelte Pubeszenz, sowie die längeren, deutlich reichlicheren, abstehenden Haare sind weisslich, kaum gelblich und verleihen der schwärzlichen Körperoberfläche ein entsprechend gefärbtes Aussehen. — Körperlänge: Poulo Dama — 10 mm, Bokkor — 11,5 mm, bei dem letzteren kaum mehr (bei dem letzteren ist die etwas dickere Gaster der Länge nach stark ausgedehnt).

Das dritte Exemplar, von Caûda (Cochinchine, Annam) ist kaum von dem Exemplar von Poulo Dama zu unterscheiden.

Manguinang, Sumatra, O. JOHN, 1913, 1 ♀. — Poulo Dama, Archipel im Golf von Siam, südlich von der Insel Phuquoe, K. DAVYDOV, Nr. 5672, 1 ♀. — Bokkor, 1080 m, Provinz Kampot in Cambodge in der Nähe des Golfes von Siam, gegenüber der Insel Phuquoe, Derselbe, Nr. 5666, 1 ♀. — Caûda, Cochinchine, Derselbe, 1 ♀.

Diacamma rugosum rugosum SM. var. **ovalis** nova.

♀ Kopf 1,3 mal so lang wie breit, parallelseitig, hinten stark abgerundet. Petiolus kaum breiter wie lang; dessen oberes Profil im vorderen ⅓ abgerundet, in den hinteren ⅔ wagerecht. Die Petiolusdornen sind mässig lang, an der Basis verbreitert, spitz, schief nach oben gerichtet, an der Spitze nach unten gekrümmt; der Abstand deren Spitzen von einander beträgt 0,59 mm, der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung, 1,31 mm.

Von der Stirn an bis zum Okzipitalrand zieht sich ein Streifen aus 5-6 groben und tiefen Runzeln, von Pubeszenz beinahe ganz frei und mit einem äusserst schwachen blauvioletten Metallschimmer; von derselben Beschaffenheit sind auch die Kopfseiten. Auf dem Pronotum befindet sich nahe dem Hinterrand ein System von 4 parallelen Querrunzeln, welches anfänglich von zirkulären und dann von hufeisenförmigen Runzeln umgeben wird. Die Epinotumseiten sind sehr scharf, breit und grob wagerecht gerunzelt und haben denselben Charakter wie die Abschnitte mit Metallschimmer auf dem Kopf; das Metasternit ist sehr schwach oberflächlich wagerecht gestreift, das Mesosternit ebenso, aber unten beinahe ganz quer, oben mehr schief. Der Rücken des Epinotums ist auf der vorderen Hälfte etwas unregelmässig gerunzelt, auf der hinteren mit einer Längsrinne; die dem Rücken anliegenden Runzeln der Epinotumseiten sind beiderseits um den Rücken nach oben gebogen und bilden ein Oval (wonach die Bezeichnung der Varietät). Petiolus sehr oberflächlich breit quergerunzelt, die obere abschüssige Fläche zur L ä n g s r i c h t u n g quergerunzelt. Der Postpetiolus bogenförmig mässig scharf, regelmässig quergerunzelt. Die kurze olivenfarbene Pubeszenz meistens ziemlich dicht, auf der Gaster, wo sie etwas bräunlich wird, sehr dicht; die abstehenden Haare mässig dicht, bräunlich gelb, die Grundfarbe des Körpers schwarz. Am Innenrand der Hinterschienen besonders grosse ovale gelblichrote Tympanalorgane. — L. 12 mm.

Ba-Me-Thuot, 700 m, Prov. Danlac, Südannam, an der Grenze von Cambodge, K. DAVYDOV, Nr. 5920, 1 ♀.

Diacamma rugosum geometricum SM.

♀. Bei dieser Rasse ist es schwer genau zu bestimmen, welche Kopfrunzel man eigentlich als die Runzel annehmen muss, welche den postero-medialen Augenrand berührt. Die letzte deutliche Runzel, welche den postero-medialen Augenrand berührt, trifft die Stirnleiste weit oberhalb der Artikulation der

Antenne, aber aus der Ecke, welche von der genannten Runzel und dem Rand des Auges gebildet wird, entspringt ein System sehr undeutlicher feiner Runzeln, welche sich mehr oder weniger fächerartig verbreiten, schwer weiter zu verfolgen sind und den Hinterrand des Clypeus nicht erreichen; eine von diesen Runzeln trifft die Artikulation der Antenne.

Das Profil der oberen abschüssigen Fläche des Profilknotens ist beinahe unter 45° orientiert; sie ist etwa ebenso lang wie die vordere senkrechte. Die Petiolusdornen lang, dünn und spitz, an der Basis erweitert, etwas divergent, an der Spitze etwas nach unten gebogen; der Abstand deren Spitzen von einander beträgt 0,56 mm, der Abstand der Linie, welche dieselben vereinigt, vom Grund der Ausbuchtung zwischen der Basis der Dornen 0,52 mm.

Die Runzelung des Thorax entspricht der Abbildung von Emery (Rend. Sess. Accad. Sci. Ist. Bologna, 1896-97, Taf., Fig. 8). Der Postpetiolus ist ziemlich oberflächlich gerunzelt. Die grobe regelmässige Runzelung der Epinotumseiten besitzt einen schwachen blau-violetten Metallschimmer.

Ambon, W. Karawajew, Nr. 2732, 2 ☿, auf einem Fussweg gefangen.

Diacamma rugosum geometricum Sm. var. **horizontalis** nova.

☿. Die Runzelung der Epinotumseiten, welche sich nicht ganz bis zum Rückenprofil erstreckt, besteht aus 5-6 groben, breiten, scharfen Runzeln, welche etwa parallel zum Rückenprofil verlaufen. Das Meso- und Metasternit oberflächlich wagerecht gerunzelt.

Die Petiolusdornen kurz, dreieckig, zugespitzt; der Abstand deren Spitzen von einander 0,56 mm, der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung 0,2 mm.

Die Pubeszenz ist kurz aber reichlich; die gleich derselben gelblich weiss gefärbten abstehenden Haare ziemlich dicht. Die Kopfseiten, die Seiten des Pronotums und besonders die Epinotumseiten mit einem schwachen blau-violetten Metallschimmer. — L. 9 mm.

Lien-Chieu bei Tourane an der Basis von Col de Nuage, Zentralannam, K. Davydov, Nr. 5636, 1 ☿.

Diacamma rugosum geometricum F. Sm. var. **anceps** Em.

☿. Ich besitze den Cotypus dieser Varietät von Engano (Bua-Bua, V.-VI. 1891, Modigliani). Der Kopf ist 1,2 mal so lang wie breit, Petiolus kaum breiter wie lang, seine obere abschüssige Fläche unter 33° geneigt. Der Abstand der Spitzen der Petiolusdornen von einander ist 0,59 mm, der Abstand der Linie, welche sie vereinigt, vom Grund der Ausbuchtung 0,39 mm.

In betreff der Runzelung zwischen dem Auge und der Stirn gilt das oben bei *geometricum* gesagte. Die Runzelung hinterhalb der Stirn, auf den Kopfseiten und den Epinotumseiten ist sehr grob und scharf. Auf dem Meso- und Metasternit ist sie sehr oberflächlich und verläuft in derselben schiefen Richtung wie auf den Epinotumseiten. Pubeszenz gelblich, ziemlich reichlich, aber kurz; Antennen, Mandibeln und Beine rötlich braun. — L. meines einzigen Exemplars 10 mm.

Diacamma rugosum geometricum SM. var. **paralleliruga** nova.

♀. Kopf 1,17 mal so lang wie breit, parallelseitig, mit sehr schwach gewölbten Seiten. Die Runzel, welche den postero-medialen Augenrand berührt, verläuft weit abseits der Artikulation der Antenne, parallel dem Seitenrand; die übrigen, welche bis zur Artikulation der Antenne gelegen sind, divergieren kaum nach vorn, erreichen aber nicht den Hinterrand des Clypeus. Die Runzeln hinterhalb der Stirn divergieren sehr schwach, so dass die Runzelung auf dem Kopf überhaupt ungefähr parallel verläuft.

Petiolusknoten 1,2 mal so breit wie lang; dessen obere abschüssige Fläche im Profil mässig gewölbt; die Dornen an der Basis breit, spitz, einander parallel, etwas nach innen gebogen, schief gestellt; der Abstand deren Spitzen von einander 0,42 mm; der Abstand der Linie, welche dieselben vereinigt, vom Grund der Ausbuchtung 0,28 mm.

Pronotum mit einem länglichen queren System von Runzeln, welches beinahe bis an die Seiten reicht, von ovalen Runzeln umgeben. Die Thoraxseiten durchaus schief gerunzelt, wobei auch die Epinotumrunzeln dicht oberhalb des Mesosternits davon keine Ausnahme machen. Die seitlichen Runzeln des Epinotums sind besonders grob, scharf und regelmässig, fast ganz nackt, mit einem schwachen Metallschimmer; einem ähnlichen Charakter hat auch die Runzelung des Postpetiolus. Der Petiolus ist weniger regelmässig und scharf quergerunzelt. Abstehende Behaarung spärlich; die Pubeszenz ist weisslich, mässig entwickelt. Anhänge gleich dem Körper dunkelbraun, beinahe schwarz, Mandibeln am Kaurand rötlich braun. — L. etwa 10 mm.

Dalat, Lang Biang, 1500 m, Südannam, K. DAVYDOV, 2. II. 1931, Nr. 5636, 1 ♀.

Diacamma rugosum geometricum F. SM. var. **debilior** KAR.

D. rugosum SM. subsp. *hortensis* FOR. var. *debilior*: KARAWAJEW, Mém. Cl. Sci. Phys.-Math. (Acad. Sci. Ucr.), Bd. VII, 1927, p. 7, ♀.

♀. Kopf 1,29 mal so lang wie breit. Der Körper schlank gebaut. Petiolus gleich breit wie lang; obere, abschüssige Fläche desselben mässig gewölbt, etwa unter 33° geneigt; der Abstand der Spitzen der kaum divergenten Petiolusdornen von einander 0,48 mm; der Abstand der Linie, welche sie vereinigt, vom Grund der Ausbuchtung 0,27 mm.

Die Runzelung auf dem Pronotum verläuft um 2-3 kurze querovale Runzeln ganz ringförmig. Die Runzelung hinterhalb der Stirn, auf den Kopfseiten und Epinotumseiten ist sehr grob und scharf und beinahe ganz kahl; auf dem Meso- und Metasternit verläuft die feine oberflächliche Runzelung im allgemeinen in derselben schiefen Richtung wie auf den Epinotumseiten, aber ganz unten ist sie daselbst ungefähr wagerecht. Auf dem Petiolusknoten ist die Runzelung mässig scharf und auf dem Postpetiolus viel feiner und äusserst oberflächlich. Die weissliche Pubeszenz ist sehr kurz und im Verhältnis zu anderen Formen mässig dicht. Antennen, Mandibeln und Beine rötlich braun. — L. 9,5 mm.

Prinsen Eiland in der Soendastrasse, 5. I. 1913, W. KARAWAJEW, Nr. 3017, 2 ♀.

Diacamma rugosum geometricum F. Sm. var. **concentrica** nova.

☿. Kopf 1,3 mal so lang wie breit, nach vorn deutlich verjüngt, hinten stark abgerundet, mit sichtbarem Okzipitalrand. Die Runzel, welche den posteromedialen Augenrand berührt, verläuft deutlich ausserhalb der Artikulation der Antenne; die Runzelung zwischen dem Auge und der Stirn ist ganz deutlich und erstreckt sich bis zum Hinterrand des Clypeus.

Petiolusknoten etwa ebenso breit wie lang, mit mässig geneigtem oberen Profil. Petiolusdornen fast von der Basis an dünn, kaum divergent, der Abstand deren Spitzen von einander 0,59 mm; der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung 0,21 mm.

Auf dem Pronotum befinden sich 2 doppeltschleifige Querrunzeln, welche so lang sind wie das ¼ der Pronotumbreite; diese Querrunzeln sind vom Anfang an von kreisförmigen konzentrischen Runzeln umgeben. Die Runzeln auf den Thoraxseiten verlaufen in schiefer Richtung, einander mehr oder weniger parallel; nur auf dem Mesosternit verlaufen sie an dessen Basis quer zu der Längsachse. Auf der Mitte des oberen Halbrings des 1. Gastersegments befindet sich ein Querstreifen aus oberflächlichen Runzeln, welche nach hinten divergent orientiert sind; übrigens ist die Gaster feinst punktiert. Die Runzelung ist im allgemeinen grob und ziemlich regelmässig, auf dem Kopf und den Epinotumseiten schärfer. Die Grundfarbe des Körpers ist beinahe schwarz, die Mandibeln, der Vorderrand des Clypeus, die Hüften und Beine rötlich braun. Die weissliche, etwas gelbliche, Pubeszenz ist mässig dicht, sehr kurz und verleiht dem Körper ein etwas olivenfarbenes Aussehen; auf der Gaster ist die Pubeszenz länger und dichter. Die Epinotumseiten sind fast nackt und besitzen einen sehr schwachen Metallschimmer. Die abstehende Behaarung ist spärlich, auf dem Kopf, Petiolus, Postpetiolus und der Gaster länger, auf dem Thorax kurz. — L. 10 mm.

Bana bei Tourane, 500-800 m, Zentralannam, K. Davydov, Nr. 5763, 1 ☿.

Diacamma rugosum sculpturatum Sm.

Ponera sculpturata: Fr. Smith, Journ. Proc. Linn. Soc. London, Zool. vol. 3, 1858, p. 142.

D. rugosum Le Guill. subsp. *sculpturatum* F. Sm.: Karawajew, Konowia, Bd. 4, 1925, p. 120.

Nach Emery (Ponerinae, Gen. Insect. Wytsman, 1911, p. 66) kommt *sculpturata* auf den Aroe Inseln und Neuguinea vor. Der Typus von Smith ist von Aroe und da meine Exemplare ebenfalls von Aroe stammen, so müssen sie als typisch betrachtet werden, indessen, nach den Abbildungen von Emery (Rend. Accad. Sci. Ist. Bologna, 1896-97, tab., fig. 8 und 11), welche seinen Exemplaren von Neugeuinea entsprechen, urteilend, unterscheiden sich die letzteren einigermassen in betreff der Runzelung von den aruanischen und müssen daher nomenklatorisch von denselben abgetrennt werden. Im folgenden gebe ich eine Beschreibung meiner ☿ von Aroe.

☿. Kopf 1,2 mal so lang wie breit, vorn deutlich verjüngt, hinten halbkreisförmig abgerundet. Petiolusknoten 1,18 mal so breit wie lang, mit mässig geneigtem oberen abschüssigen Profil. Dornen lang, divergent, allmählich zuge-

spitzt; der Abstand der Spitzen von einander 0,7 mm; der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung 0,28 mm.

Die Runzel, welche den postero-medialen Augenrand berührt, verläuft bedeutend ausserhalb der Artikulation der Antenne. Die Runzelung des Kopfes, sowie des Körpers überhaupt, ist äusserst regelmässig und scharf. Auf den Thoraxseiten verläuft die Runzelung unter einem etwas mehr geneigten Winkel als das auf der entsprechenden Abbildung von EMERY dargestellt ist, so dass die Runzeln auf dem Mesosternit nicht rechtwinkelig zu dessen Naht mit dem Mesosternit orientiert sind, sondern kaum geneigt. Bei Betrachtung des Epinotumrückens von oben bilden die Runzeln eine nach hinten gerichtete Parabel; nur die ganz vordersten Runzeln bilden einen spitzen Winkel. Auf dem Pronotum sind die 2-3 zentralen Querrunzeln viel kürzer als auf der Abbildung von EMERY (fig. 5), wodurch die seitlichen Runzeln (bei Ansicht des Thorax von der Seite) einen viel flacheren Bogen bilden. Ein breiter Querstreifen auf dem oberen Halbring des 1. Gastersegments ist oberflächlich längsgestreift; ähnliche schmale Streifen befinden sich am Vorderrand des 2. und 3. Segmentes.

Die Pubeszenz ist auf dem Kopf und dem Thorax mikroskopisch fein, wenig auffallend, auf den Epinotumseiten und dem Postpetiolus beinahe ganz abwesend; auf der Gaster, ausser den gestreiften Abschnitten, länger und reichlicher. Die abstehende Behaarung ist kurz und mässig, auf der Gaster länger und reichlicher. Tief braunschwarz. Die Fühler, Mandibeln, Beine und Spitze der Gaster bräunlich. Der Hinterteil des Kopfes, das Pronotum, Petiolus, Postpetiolus und besonders die Seiten des Epinotums mit einem schwachen violetten Metallschimmer. — L. 8,5-9,5 mm.

♂. EMERY sagt in seiner Monographie der Ponerinen: „Les mâles de la sous-tribu des Pachycondylini, qui ont le pygidium prolongé nettement du segment suivant par un étranglement, sont très difficiles à déterminer. Cette difficulté dépend sans doute en partie de ce qu'on ne connaît que peu d'espèces de ces mâles, de sorte que l'on ne sait pas discerner les différences génériques des caractères spécifiques et par conséquent formuler correctement les diagnoses de ces genres.

„Les mâles de *Diacamma* se font remarquer surtout par leur épistome prolongé en avant plus que chez les autres genres voisins. Les antennes sont fort longues; le scape beaucoup plus court que le troisième article. Les yeux occupent presque tout le coté de la tête. Le mésonotum est bombé, ne laissant découvert qu'une petite partie du pronotum. Le pétiole est surmonté d'un noeud subconique, arrondie au sommet".

Die oben angeführte Diagnose passt so sehr zu meinen Exemplaren, dass ich nur einige morphologische Merkmale, sowie eine Reihe von Ausmessungen, beifüge.

Scutellum sehr stark aufgeblasen. Mandibeln lang, spatelförmig. Flügelgeäder vom *Pheidole*-Typus, mit 2 geschlossenen Kubitalzellen und 1 geschlossenen Discoidalzelle. Die Genitalanhänge konnten nur nach einer Präparation ausführlich beschrieben werden. Pubeszenz kurz und dicht, auf der Gaster lang, besonders gegen deren Spitze. Gelblich ockerfarben.

Allgemeine Körperlänge etwa 8,5 mm. L. der Vorderflügel 7,5 mm. Kopflänge 1,22, Kopfbreite (mit Augen) 1,36. Längsdurchmesser der Augen 0,73. Ocellen ziemlich klein. Scapus 0,28, Geissellänge 9,66, 1. Geisselglied 0,14, 2. Glied 0,98, 3. Glied 0,98, Endglied der 12-gliedrigen Geissel 1,77, 2. Glied der Maxillartaster 0,14, 3. Glied 0,25, 4. Glied 0,32, 5. Glied 0,23, 6. Glied 0,16, L. der 3-gliedrigen Lippentaster 1,4. Femur des 3. Beinpaares 2,41, Tibia 2,27, 1. Tarsusglied 1,92, 2.: 0,97, 3.: 0,7, 4.: 0,42, 5.: 0,38 mm.

Wammar, Aroe-Archipel, W. Karawajew, Nr. 2665. Ein grosses Erdnest zwischen zwei Wurzeln und dem Stamm eines grossen Baumes, ungefähr 20 cm hoch, ♀♀ und einige ♂♂. In meiner oben genannten Arbeit fehlt die Beschreibung des ♂; bei der späterer Durchsicht des gesammelten Materials habe ich aber doch 2 ♂ gefunden, deren Beschreibung oben angeführt ist.

Diacamma rugosum sculpturatum F. Sm. var. **papuana** nova [1]).

D. rugosum subsp. *sculpturatum* F. Sm.: Emery, Rend. Sess. Accad. Ist. Bologna, 1896-97, p. 159.

♀. Auf Grund der Abbildungen von Emery kann ich folgende Unterschiedsmerkmale dieser Varietät vom Typus (vgl. das oben in betreff des Typus gesagte) hervorheben: Die zentralen Querrunzeln auf dem Pronotum erstrecken sich im Gegenteil zu der genannten Varietät beinahe bis zu den seitlichen Vorsprüngen; bei Betrachtung des Thorax von der Seite bilden die Runzeln, welche um diese Gruppe gelegen sind, einen viel gewölbteren Bogen als bei *sculpturatum;* die Runzeln auf dem Metasternit sind zu der Naht mit dem Mesosternit rechtwinkelig orientiert.

Neuguinea, Kollektion von Emery.

Diacamma rugosum latispinum Kar. (Abb. 3).

Ich mache im folgenden einige Zusätze zu meiner früheren Beschreibung dieser eigenartigen Rasse und gebe eine Abbildung des Thorax in seitlicher Ansicht um die charakteristische Runzelung zu veranschaulichen.

♀. Kopf 1,2 mal so lang wie breit, parallelseitig. Petiolus gleich lang wie breit; die obere abschüssige Fläche desselben im Profil bogenförmig abgegrenzt, ziemlich stark geneigt. Petiolusdornen dünn und spitz, etwas divergent, die Spitzen kaum nach unten gebogen; der Abstand derselben von einander 0,84 mm; der Abstand der Linie, welche die Spitzen miteinander verbindet, vom Grund der Ausbuchtung 0,42 mm.

In meiner früheren Diagnose sage ich: „auf der hinteren Hälfte des Pronotums eine mediale hervorragende Leiste, welche sich quer durch die bogen-

[1]) Die Bezeichnung der Form von Neuguinea als Varietät macht gewiss wie in so vielen anderen ähnlichen Fällen den Eindruck, alsob gewisse Grunde vorhanden wären die aroeanische Form als die Stammform der papuanischen anzunehmen, wofür wir selbstverständlich ebenso wenig Grund haben wie für die entgegengesetzte Annahme.

In meiner Arbeit über die Ameisen von den Molukken und Neuguinea (Zool. Anzeiger, Bd. 92, 1930, p. 212) führe ich *Diacamma sculpturatum* Sm. „prope var. pubeszens Em." für Ambon an. Unglücklicherweise ist dieses einzige Exemplar verloren gegangen und ich habe jetzt keine Möglichkeit meine Determination zu prüfen.

förmigen Runzeln zieht"; es wird besser sein zu sagen: „welche sich durch die hufeisenförmigen Runzeln zieht". Die Abbildung des Thorax gibt ohne weiteres ein Bild von der Orientierung und dem Grad der Ausbildung der Runzeln auf demselben. Die Orientierung derselben erinnert einigermassen an *geminatum* EM. und *vagans* SM.

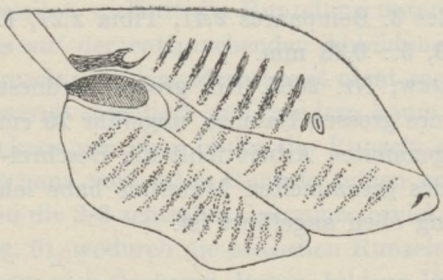


Abb. 3. — Hinterer Abschnitt des Thorax des ♀ von *Diacamma rugosum latispinum* KAR., in seitlicher Ansicht.

Die Runzelung auf dem Kopf ist ziemlich grob und scharf, auf dem übrigen Körper dagegen, mit Ausnahme des Epinotums, sehr oberflächlich; besonders oberflächlich auf dem Petiolusknoten und noch mehr auf dem Mesosternit und Metasternit; auf dem Epinotum ist die Runzelung grob und scharf, besitzt diesen Charakter aber nur in dem mittleren Drittel und erstreckt sich bei weitem nicht bis zum Rückenprofil. Die weissliche ziemlich lange Pubeszenz ist reichlich, nur auf der starken Runzelung des Epinotums kaum anwesend. Die Grundfarbe des Körpers ist dunkelbraun; die Antennen, Mandibeln und Beine dunkel rötlich-braun. — L. 10 mm.

Tjiapoes am Abhang des Salak-Vulkans, W. Java, W. KARAWAJEW, Nr. 2900, 1 ♀.

Diacamma rugosum gibbosum subsp. nov. (Abb. 4).

♀. Der Kopf ist 1,35 mal so lang wie breit, parallelseitig, mit stark bogenförmig gewölbtem Okzipitalrand, welcher teilweise von dem Artikulationsrand gebildet wird. Die Runzel, welche den postero-medialen Augenrand berührt, verläuft weit ausserhalb der Artikulation der Antenne; die Runzeln, welche noch weiter nach aussen verlaufen, sind sehr oberflachlich und divergieren etwas nach aussen. Die Runzeln der hinteren Kopfhälfte sind ziemlich grob, sehr scharf und regelmässig; sie divergieren wenig nach hinten.

Der Thorax ist etwas gedrungen, etwa doppelt so lang wie hoch, mit einem mehr gewölbten Uebergang der Basalfläche des Epinotums in die abschüssige als bei den meisten Arten. Petiolus kaum breiter wie lang, von hinten betrachtet breit eiförmig (oben breiter); von der Seite betrachtet, ist der Petiolus nach oben kaum verjüngt, das obere Profil bogenförmig gewölbt, wenig abschüssig, dicht vor den Dornen wagerecht. Petiolusdornen an der Basis breit, gleichmässig gegen die Spitze verjüngt, einander parallel; der Abstand der Spitzen von einander 0,45 mm; der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung 0,32 mm.

Das System der Querrunzeln auf dem Pronotum ist wie bei *geometricum;* die Runzelung ist grob, scharf und regelmässig. Auf den Thoraxseiten ist sie schief orientiert, wobei dieselbe im Bereich der Epinotumwölbung beinahe unter rechtem Winkel zu derselben orientiert ist; mehr nach vorn, oberhalb des Me-

sosternits, biegen sich die Runzeln etwas nach hinten um; ganz vorn wird die Runzelung unregelmässig; so ist sie auch auf der Basalfläche des Epinotums, wo die Runzeln unter einem Winkel an einander stossen; ganz vor der abschüssigen Fläche ist eine kurze breite unregelmässig gerunzelte Längsrinne vorhanden. Die Runzelung auf dem Epinotum ist ebenso grob, scharf und regelmässig wie auf dem Pronotum. Die Runzelung auf dem Mesosternit und Metasternit ist oberflächlich. Die Querrunzelung auf dem Petiolus ist etwas weniger grob und etwas oberflächlich. Auf dem Postpetiolus ist sie sehr grob, scharf und besonders regelmässig, die Runzeln bilden ziemlich breite Parabeln. Die Gaster ist äusserst fein, mikroskopisch, punktiert, sehr glänzend. Die Grundfarbe des Körpers ist tiefschwarz, die hintere Hälfte des Kopfes, das Pronotum, Epinotum und der Postpetiolus mit einem schwachem Metallschimmer; die Mandibeln am Kaurand, die Mittel- und Hinterhüften, Beingelenke und Tarsen bräunlich. Die vordere Hälfte des Kopfes, ein Rand um das Pronotum, die Hüften, Beine, Meso- und Metasternit mit einer dichten weisslichen Pubeszenz, der Petiolus und die Gaster mit einer spärlicheren. Auf der Unterseite des Kopfes dichte lange abstehende Haare, welche auf dem Hinterhaupt kürzer werden; abstehende Behaarung übrigens sehr spärlich, auf dem Pronotum fast, auf den Seiten des Epinotums und der Oberseite des Postpetiolus ganz abwesend. — L. 8 mm.

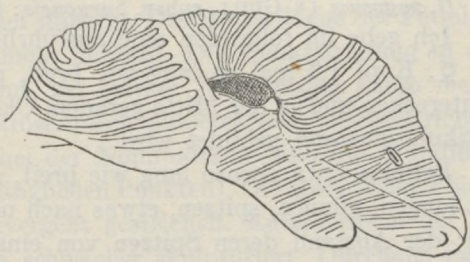


Abb. 4. — Thorax des ♀ von *Diacamma rugosum gibbosum*, subsp. n., in seitlicher Ansicht.

Dalat, Lang Biang, 1500 m, Südannam, K. Davydov, Nr. 5760, 1 ♀.

Ausser diesem Exemplar besitze ich aus derselben Gegend noch ein zweites (Nr. 5762), welches eine noch spärlichere Pubeszenz besitzt und daher viel glänzender erscheint, ich habe es aber nicht für die ausführliche Beschreibung gewählt weil es verletzt (vgl. unten) ist. Ich finde mich, trotz gewisser Unterschiede, noch nicht berechtigt, dasselbe von dem oben beschriebenen nomenklatorisch zu trennen.

Der Thorax dieses Exemplars ist deutlich schlanker, nämlich 2,4 mal so lang wie hoch. Die Pubeszenz ist, wie oben bemerkt, viel schwächer entwickelt und der Körper, besonders die Gaster, viel glänzender.

Das betreffende Exemplar trägt offenbar die Folgen einer geheilten Verwundung. Die normale Chitindecke der linken Seite des Epinotums und Petiolus ist abgerissen und auf dieser Fläche hat sich eine neue feine, grell ockerfarbene Chitincuticula gebildet, welche keine Spur einer Skulptur trägt; die Begrenzung dieser Fläche ist äusserst scharf; ganz vorn auf dem Epinotum sind einige ganz winzige Inselchen einer normalen dunklen Cuticula sichtbar. Da man sich es nicht anders vorstellen kann als dass die Chitindecke bei der Verwundung (durch einen Vogel?) gesamt mit dem Hypoderm abgerissen wurde, so muss man ver-

muten dass ein neues Hypoderm sich von den Rändern der Wunde aus auf die ganze Fläche regeneriert hat; das ist aber gewiss nur eine Vermutung und der Vorgang dieser anormalen Bildung bleibt ziemlich rätselhaft. Es ist noch zu bemerken dass sowie das Epinotumstigma, so auch das Petiolusstigma auf der neuen Cuticula ganz normal gebildet sind; der Petiolus ist etwas asymmetrisch verstümmelt.

Diacamma rugosum buruense KAR.

D. rugosum LE GUILL. subsp. *buruensis*: KARAWAJEW, Konowia, Bd. 4, 1925, p. 117.

Ich gebe im folgenden eine ausführlichere Beschreibung dieser Rasse.

☿. Kopf 1,3 mal so lang wie breit, parallelseitig, mit stark abgerundeten Hinterecken und in der Mitte geradem Okzipitalrand, welcher teilweise von dem Artikulationsrand gebildet wird.

Petiolus etwa ebenso lang wie breit, mit schwach geneigtem oberen Profil, mit langen, dünnen, spitzen, etwas nach unten gebogenen und divergenten Dornen; der Abstand deren Spitzen von einander beträgt 0,63 mm; der Abstand der Linie, welche die Spitzen vereinigt, vom Grund der Ausbuchtung 0,35 mm.

Die Runzelung auf dem Kopf ist sehr fein und oberflächlich, die Runzeln selbst breit und abgerundet. Der Verlauf derselben, sowohl auf dem Pronotum, als auch auf dem Thorax, ist ungefähr so wie ihn EMERY (Rend. Sess. Accad. Sci. Ist. Bologna, 1896-97, Fig. 3 und 8) für *geometricum* abbildet, doch verlaufen die Runzeln auf dem Metasternit wagerecht und auf dem Mesosternit nur etwas schief, der Orientierung derselben auf dem Epinotum entsprechend. Die Rinne auf dem Epinotumrücken ist nur ganz hinten in Form eines kurzen verlängerten Eindrucks markiert; vor demselben ist die Runzelung durch eine grobe weitläufige Punktierung ersetzt. Die abschüssige Fläche des Epinotums ist mit breiten nach unten gebogenen Runzeln bedeckt; seitlich ist sie durch abgerundete Kiele abgegrenzt. Der Petiolus ist oben, an den Seiten und vorn äusserst oberflächlich quergerunzelt, an den Seiten unten sogar garnicht gerunzelt, dagegen die hintere Fläche äusserst grob und regelmässig quergestreift, wobei die Oberfläche der abgerundeten erhabenen Streifen sehr glatt und glänzend ist. Der Postpetiolus ist ganz ungestreift, mit zerstreuten Punkten, welchen die abstehenden Haare entspringen.

Dunkel kaffeebraun, dank der feinsten Punktierung und der dichten anliegenden olivenfarbenen Pubeszenz im allgemeinen matt. Die Fühler, Mandibeln und Beine etwas bräunlich. Die langen abstehenden bräunlichen Haare reichlich. — L. 11-12 mm.

Tifoe auf der Insel Boeroe (Buru), W. KARAWAJEW, Nr. 2734, einige ☿☿.

Pachycondyla (Ectomomyrmex) annamita (ERN. ANDRÉ).

Tourana Lien Cheu, Sept. 1931, K. DAVYDOV, 1 ☿. — Archipel Poulo Dama im Golf von Siam, Derselbe, Nr. 5674, 1 ☿.

Pachycondyla (Ectomomyrmex) striatula nom. nov.

P. (Ectomomyrmex) striata: KARAWAJEW, Mem. Cl. Sci. Phys.-Math. (Acad. Sci. Ukraine), t. 7, 1927, p. 5.

Da die Benennung meiner ambonesischen *striata* durch die südamerikanische *Pachycondyla* (*Pachycondyla*) *striata* F. Sm. präoccupiert ist, so gebe ich ihr die neue Benennung *striatula*.

Pachycondyla (Ectomomyrmex) astuta obscura subsp. nova.

☿. Kopf 1,1 mal so lang wie breit (2,24 mm lang, 2,03 mm breit, — bei der Nominatrasse ebenso lang wie breit), die Kopfseiten kaum weniger konkav, seicht bogenförmig ausgerandet. Der Vorderrand des Clypeus in der Mitte sehr seicht ausgerandet (bei *astuta astuta* viel stärker). Die Hinterfläche der Petiolusschuppe in Profilansicht oben etwas mehr gewölbt. Die Punktstreifung in der Okzipitalgegend regelmässiger divergent, bei starker Beleuchtung kaum merkbar violett irisierend. Mandibeln mikroskopisch äusserst fein längsgestrichelt, matt, ohne zerstreute grobe Punkte (bei der Nominatrasse sind die Mandibeln halbglänzend, mit zerstreuten groben länglichen Punkten). Die abschüssige Fläche des Epinotums deutlich nach oben divergent gestrichelt. Entsprechend der geringeren Grösse im allgemeinen etwas schwächer skulpturiert. Durchaus matt. Uebrigens der Nominatrasse gleich. — L. (mit geneigtem Kopf) etwa 9 mm.

Tonkin, Phu-ho, K. Davydov, Nr. 5719, 1 ☿.

Pachycondyla (Ectomomyrmex) punctata sp. n. (Abb. 5).

☿. Kopf 1,09 mal so lang wie breit, Okzipitalrand beinahe gerade, mit beinahe ganz spitzen Hinterecken. Vorn ist der Kopf deutlich schmäler, die Kopfseiten schwach bogenförmig gewölbt. Die Okzipitalkante vorn und seitlich gut ausgeprägt, die in der hinteren Hälfte des Kopfes gut abgegrenzte seitliche Kopffläche ist beinahe 1½ mal so breit wie die Okzipitalfläche; letztere, von hinten betrachtet, lauft wie in zugespitzte Beulen aus (in Wirklichkeit, von der Seite betrachtet, sind sie bogenförmig und flach). Clypeus scharf gekielt, vorn in eine kleine Spitze auslaufend. Die Stirnlappen stark ausgebildet, zusammen etwas mehr als doppelt so breit wie der schmälste Abschnitt der Stirn. Stirnfurche tief, gleich lang wie die Stirnleisten. Der Längsdurchmesser der Augen dem Abstand deren Vorderrandes vom Hinterrand des Clypeus gleich. Mandibeln mit drei grösseren spitzen Vorderzähnen und vier kleineren dahinter. Der Scapus überragt den Okzipitalrand beinahe um die Dicke an seinem Ende; Funiculus 1½ mal so lang wie der erstere. Pronotum oben etwas abgeflacht, dessen Seiten einander parallel; letztere laufen unten, vor den Vorderhüften, in flache am Ende abgerundete Spitzen aus; die abschüssige Fläche des Epinotums kaum konkav. Der Petiolus kaum höher als der angrenzende Teil des Postpetiolus; seine vordere und hintere Fläche sind einander ganz parallel; von hinten betrachtet, ist er sehr breit eiförmig, in der oberen Hälfte halbkreisförmig

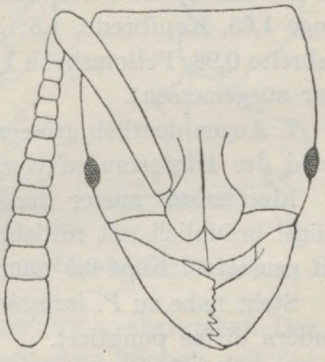


Abb. 5. — Kopf des ☿ von *Pachycondyla (Ectomomyrmex) punctata*, sp. n.

begrenzt; von oben betrachtet, vorn bogenförmig begrenzt; oben ist er in beiden Richtungen abgerundet, doch hinten etwas mehr.

Kopf sehr scharf punktiert, matt, die Okzipitalfläche undeutlich fein punktiert und äusserst scharf dachförmig gerunzelt; der Abschnitt zwischen den Augen und der Antennengrube zwischen den Punkten ziemlich scharf gerunzelt; ebenso die untere Hälfte der Kopfseiten und die Unterseite des gesamten Kopfes, woselbst die Runzeln nach hinten divergieren und die mikroskopisch feine Punktierung beinahe fehlt; unten ist der Kopf halbglänzend; die Stirnlappen sind äusserst fein punktiert und dazwischen fein gestrichelt. Scapus fein punktiert. Clypeus fein unregelmässig punktiert. Mandibeln äusserst fein längsgestrichelt, matt. Thorax feiner als der Kopf punktiert, wobei die Punktierung auf dem Pronotum in bogenförmigen Reihen geordnet ist; auf dem Mesoepinotum oben, besonders auf dem Letzteren, ausserdem mit zerstreuten groben tiefen Punkten; Mesosternit der Länge nach mit einigen groben Falten; eine tiefere Randfalte am unteren Rand des Pronotums; Metasternit längsgestrichelt, die abschüssige Fläche des Epinotums fein quergestrichelt. Petiolus fein punktiert und oben gleich dem Mesoepinotum mit zerstreuten groben Punkten; die hintere Fläche desselben beinahe glatt und halbglänzend, mit einer feinsten Querstrichelung. Postpetiolus und Gaster noch feiner punktiert und der erstere oben vorn mit zerstreuten schwach ausgeprägten Punkten. Der Körper im allgemeinen matt.

Mit mässig entwickelten rötlich-braunen abstehenden Haaren verschiedener Länge, die hauptsächlich oben vorhanden sind; auf dem Postpetiolus und der Gaster ausserdem eine ziemlich dichte anliegende Pubeszenz. Tief dunkelbraun, beinahe schwarz, mit rötlich-braunen Mandibeln, Gelenken, Funiculus, Schienen, Tarsen und Spitze der Gaster. — L. mit geneigtem Kopf beinahe 8 mm. Kopflänge 1,65, Kopfbreite, 1,5; Abstand zwischen den Okzipitalbeulen 1,15, Petiolusbreite 0,98, Petiolushöhe 1,08 (?), Petioluslänge 0,63 (es wurde nur ein Exemplar ausgemessen).

♀. Augen deutlich grösser; deren Längsdurchmesser etwas mehr als der Abstand des Hinterrandes vom Vorderrand des Clypeus.

Mesonotum ausser der feinen Punktierung unregelmässig längsgerunzelt. Flügel bräunlich mit rötlichbraunem Geäder. Uebrigens dem ☿ ähnlich. — L. mit geneigtem Kopf 9,5 mm, L. der Vorderflügel 6 mm.

Steht nahe zu *P. leeuwenhoeki* FOR., der Kopf ist aber nicht längsgestreift, sondern diffus punktiert.

Bana bei Tourane, 500-800 m, Zentralannam, 27. IX. 1931, K. DAVYDOV, Nr. 5718, 3 ☿ und 3 geflüg. ♀.

Euponera (Brachyponera) nigrita EM.

Bana bei Tourane, 500-800 m, Zentralannam, K. DAVYDOV, Nr. 5793, 1 ♀. — Pic Lang Biang, 1500 m, Dalat, Südannam, Derselbe, Nr. 5634 und 5795, 5 ☿.

Ich mache darauf aufmerksam dass ich diese indo-malayische Ameise vor kurzem im Botanischen Garten von Suchum (Transkaukasien) in freier

Natur gefunden habe [1]), woselbst sich dieselbe offenbar vermehrt, da die von mir gefangenen Exemplare ♀♀ waren.

Euponera nigrita ist im indo-malayischen Gebiet heimisch. Ausser den oben angeführten Fundorten ist sie bekannt für Sumatra, Sikkim, Birma und Tenaserim. Eine Unterart davon, *chinensis* Em., ist aus Schanghai beschrieben. Das obige Auffinden einer tropischen Ameise in der gemässigten Zone in freier Natur stellt meines Wissens den ersten Fall dieser Art dar. Die Ameise wurde offenbar durch Vermittlung von tropischen Gewächsen in den botanischen Garten importiert, woselbst sie sich derart akklimatisierte, dass sie sich vermehrt. Suchum zeichnet sich durch ein sehr mildes Klima aus, dennoch sinkt die Temperatur daselbst im Winter manchmal bis einige Grad unter 0.

Ponera typhlos sp. n. (Abb. 6).

♀. Kopf 1,08 mal so lang wie breit, hinten deutlich breiter, mit schwach gewölbten Seiten und etwas konkavem Okzipitalrand. Der Clypeus ist in der Mitte sehr schwach bogenförmig vorgewölbt, vor der Stirn in der hinteren Hälfte mit einem starken kielförmigen, oben abgerundeten, Vorsprung; zwischen den Stirnlappen eine Längsrinne. Der Scapus erreicht nicht den Okzipitalrand um die 1½ Dicke an seinem Ende. Das 1. Funiculusglied so lang wie die 4 folgenden zusammengenommen; das 2. kaum länger wie das 3.; die Glieder 2-6 deutlich breiter wie lang. Mandibeln länglich dreieckig mit 6-7 meistens ziemlich grossen, dreieckigen spitzen Zähnen. Von den Augen keine Spur. Pronotum etwa ⅔ so breit wie der Kopf.

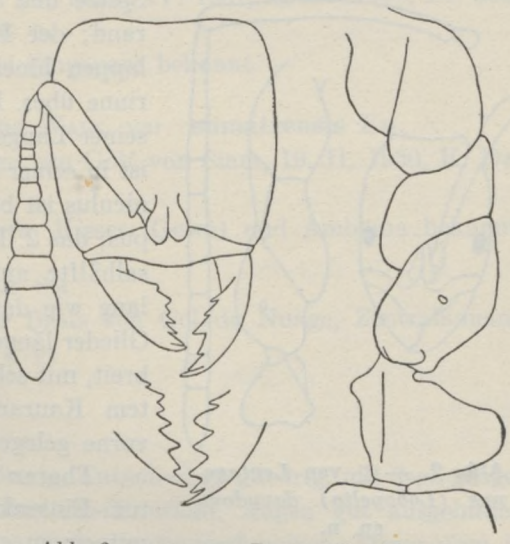


Abb. 6. — ♀ von *Ponera Typhlos*, sp. n.

Thoraxprofil ziemlich geradlinig, mit je einer deutlichen Einsenkung der Promesonotum- und Mesoepinotum-Naht; der Uebergang der Basalfläche des Epinotums in die abschüssige ist breit bogenförmig abgegrenzt. Der Petiolus ist etwas höher wie lang, der Knoten im Profil etwa konisch, mit abgerundeter Spitze und einer bogenförmigen Einsenkung am Vorderrand; von oben betrachtet, ist er breiter wie lang, so breit wie die Basalfläche des Epinotums; unten vorn ist der Petiolus mit einem medianen flachen abgerundeten Vorsprung versehen. Der Postpetiolus ist vorn geradlinig und rechtwinkelig abgestutzt, etwas kürzer wie hoch.

Aeusserst dicht, mikroskopisch fein, punktiert, durchaus matt, dagegen die Mandibeln, der Vorderrand des Clypeus und die vordere, etwas konkave, Fläche

[1]) Zool. Anzeiger, Bd. 92, 1931, p. 316.

des Petiolusknotens spiegelglatt und glänzend. Mit sehr dichten und sehr kurzen anliegenden Härchen und ausserdem mit spärlichen, mehr oder weniger abstehenden, Haaren verschiedener Länge. Rötlich gelbbraun, der Kopf und die Mandibeln etwas dunkler, der Zahnrand der letzteren und der Vorderrand des Clypeus braun. — L. etwa 2 mm.

Cay-Dua, Ins. Phuquoe im Golf von Siam, 26. XI. 1931, K. DAVYDOV, Nr. 5664, 1 ♀. — Caûda, Cochinchine, Derselbe, Nr. 5680, 1 ♀.

Leptogenys (Lobopelta) davydovi sp. n. (Abb. 7).

♀. Kopf, nur die Länge des Seitenrandes gemessen, 1,17 mal so lang wie breit, mit dem Clypeus — 1,5 mal. Im ganzen, mit den Mandibeln, ist der Kopf lang eiförmig, mit schwach gewölbten, parallelen, Seiten, hinten abgerundet, wodurch er daselbst schmäler als vorn erscheint, den Okzipitalrand bildet auf einer bedeutenden Strecke der Artikulationsrand, der bei Frontalansicht des Kopfes etwas konkav erscheint. Der mittlere Abschnitt des Clypeus mit stark hinaufragendem Kiel; er ist stark dreieckig vorgestreckt, mit etwas abgerundeter Spitze und stufenartigem abgeplatteten Seitenrand; der Kiel ragt stark zwischen die Stirnlappen hinein und geht weiter in eine Längsrinne über. Der Scapus ragt beinahe um das ⅓ seiner Länge über den Okzipitalrand hinaus; er ist in seiner Basalhälfte seicht gebogen. Der Funiculus ist beinahe 1,7 mal so lang wie der Scapus; das 2. Funiculusglied, welches in seiner Basalhälfte auffallend dünn ist, ist 1,33 mal so lang wie das 1., 1,6 mal wie das 3., sämtliche Glieder länger wie breit. Mandibeln lang, mässig breit, mit schiefem ungleichmässig fein gezähneltem Kaurand. Augen klein, oval, nahe nach vorne gelegen.

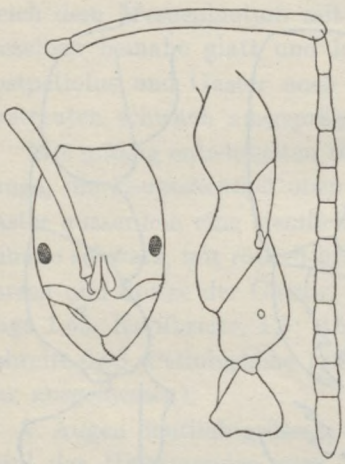


Abb. 7. — ♀ von *Leptogenys (Lobopelta) davydovi*, sp. n.

Thorax mit einer sehr seichten Mesoepinotum-Einsenkung. Petiolus gleich hoch wie lang, mit einem etwa konischen seitlichen abgeflachten Knoten, der 1½ mal so breit ist wie vorn; an der Spitze ist er abgerundet; die Vorderfläche im Profil konvex, die hintere geradlinig. Die Gaster mit dem Postpetiolus ist kaum länger wie der Thorax.

Mandibeln mit kaum warnehmbaren länglichen Punkten, halbmatt; übrigens ist der Körper sehr glatt und glänzend. Mit mässig dichten langen graulichen abstehenden Haaren, die auf den Hüften und der Gaster sogar als reichlich zu bezeichnen sind. Ziemlich gleichmässig kastanienbraun. — L. 7,5 mm.

Gehört in die Gruppe von *assamiensis* FOR., *peuqueti* ER. AND. und *watsoni* FOR.

Bana bei Tourane, 1400 m, Zentralannam, 1. X. 1931, K. DAVYDOV, Nr. 5660, 1 ♀.

Odontomachus haematoda L.

Bana bei Tourane, 1400 m, Zentralannam, 1. X. 1931, K. Davydov, Nr. 5661, 1 ♀. — Lang Biang, 1500 m, Dalat, Südannam, 2. II. 1931, Derselbe, Nr. 5758, 1 ♀ und 1 flügelloses ♀.

Odontomachus rixosus Sm.

Ream, Prov. Kampot, Cambodge, am Golf von Siam, II. 1930, K. Davydov, Nr. 5668, 4 ♀.

Subfam. MYRMICINAE.

Sima (Sima) rufonigra Jerd.

Pursat, Cambodge, Ufer des Grand Lac, 10. III. 1930, K. Davydov, Nr. 5683, 1 ♀.

Für das kontinentale Indien, Ceylon und Sumatra bekannt.

Sima (Sima) pilosa Sm.

Archipel Poulo Condore im Golf von Siam, IV. 1931, K. Davydov, Nr. 5658 und ebenda 30. I. 1930, Nr. 5665, 3 ♀.

Für die Malayischen Inseln und Singapore bekannt.

Sima (Tetraponera) allaborans Walk. var. **sumatrensis** Em.

Ream, Prov. Kampot, Cambodge, am Golf von Siam, 19. II. 1930, K. Davydov, Nr. 5684, 1 ♀.

Für Sumatra, Java, Banda Neira, Kisser (Geser) und Amboina bekannt.

Sima (Tetraponera) attenuata Sm.

Lien Cheû bei Tourane, an der Basis von Col de Nuage, Zentralannam, Sept. 1931, K. Davydov, Nr. 5637, 4 ♀.

Für Borneo und Java bekannt.

Conothorax gen. nov.

♀. Kopf mit den Mandibeln eiförmig. Antennen 12-gliedrig, mit 3-gliedriger langer Clava. Mandibeln mit gezähneltem Kaurand. Augen gut ausgebildet, konvex. Pro- und Mesothorax fast ganz zusammengeschmolzen, Mesonotum in einem Konus auslaufend. Epinotumbewaffnung in Form eines Paars beulenartiger Spitzen. Postpetiolus sehr breit. Abstehende Haare einfach zugespitzt.

Die Gattung, deren unten beschriebene Art *bilobum* aus Annam stammt, muss zu dem Tribus *Pheidolini* gestellt werden. Die näheren verwandtschaftlichen Beziehungen zu den anderen Gattungen sind unklar.

Conothorax bilobum sp. n. (Abb. 8).

♀. Kopf mit den Mandibeln eiförmig, etwa 1,04 mal so lang wie breit, mit recht abgerundetem Okzipitalrand. Mandibeln mit breitem Kaurand, welcher vorn 3 grössere und dahinter 3 kleinere Zähne trägt. Der vordere Clypeusrand in der Mitte bogenförmig ausgeschnitten, so dass sich ein Paar breiter

bogenförmig begrenzter Hervorwölbungen bildet. Stirn breit (If = etwa 2,8), mit parallelen, schwach S-förmig gebogenen, Stirnleisten und breiten zugespitzten Lappen. Das Stirnfeld ist lang, hinten abgerundet, vorn ohne unterscheidbare Naht. Die Antennengruben sind sehr umfangreich, hinten und seitlich durch schleifenförmige Runzeln abgegrenzt. Der hintere Rand des Clypeus ist nicht wie bei *Tetramorium* hervorspringend, sondern abgerundet. Der Scapus mehr als um ⅓ seiner Länge über den Okzipitalrand hinausreichend. Clava 3-gliedrig, etwas länger als der Rest des Funiculus; die 2 ersten Glieder beinahe gleich lang, das Endglied 1½ mal so lang wie das vorletzte, das 2. Glied etwas länger als das 3. Augen gross, oval, gewölbt, vor der Mitte der Kopfseiten gelegen.

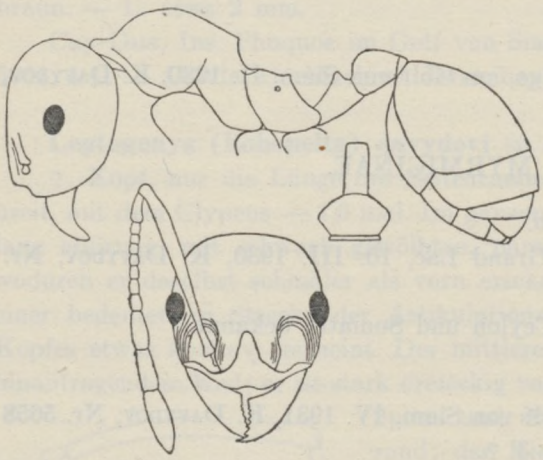


Abb. 8. — ♀ von *Conothorax bilobum*, gen. et sp. n.

Promesonotum viel breiter als das Epinotum, von demselben seitlich abgeschnürt und am Rückenprofil dank dem konischen Vorsprung des Mesonotums stark ausgebuchtet. Der Prothorax mit dem Mesothorax bis auf die seitliche Naht, welche sich bis zum rudimentären Stigma erstreckt, ganz zusammengeflossen. Die Pronotumseiten mit einem Paar kleiner spitzer Höckerchen. Petiolus in Profilansicht etwa konisch, mit einem spitzen Vorsprung des Knotens, welcher hinten ausgerandet ist; von oben betrachtet, erscheint der Petiolus parallelseitig. Der Postpetiolus ist beinahe ⅔ so breit wie lang, 3 mal so breit wie der Petiolus.

Die Stirnlappen mit spärlichen feinsten Längsstricheln, die Wangen mit spärlichen etwas gröberen scharfen Längsrunzeln, welche sich teilweise um die Antennengruben schleifenartig umbiegen. Ausserdem ist der Kopf mikroskopisch fein punktiert, ziemlich matt. Stirnfeld glatt und glänzend. Mandibeln äusserst fein längsgestrichelt, übrigens glatt und glänzend. Mesosternit dicht punktiert und etwas längsgerunzelt. Unterhalb des Epinotumstigmas eine starke grübchenartige Einsenkung und weiter unten eine Punktierung und einige grobe scharfe Längsrunzeln. Das Pronotum, die basale und abschüssige Fläche des Epinotums feinst punktiert, halbglänzend. Stielchenglieder dicht punktiert, halbglänzend. Gaster glatt und glänzend.

Die anliegende Pubeszenz fehlt, die bogenförmigen abstehenden Haare mässig, hauptsächlich oben, entwickelt, auf dem Kopf gleichmässiger verteilt und daselbst hauptsächlich schief gestellt. Gelblichbraun, die Anhänge lichter, gelblicher. — Etwa 2,75 mm lang.

Caûda, Cambodge, K. DAVYDOV, Nr. 5759, 1 ♀.

Pheidole (Pheidole) megacephala F.

Ream, Prov. Kampot am Golf von Siam, Cambodge, 19. II. 1930, K. Davydov, Nr. 5804, 1 ☿. — Hangoy, Tonkin, Bai d'Along an der Chinesischen Grenze, nördlich von Haïphong, X. 1931, Derselbe, Nr. 5717, 3 ☿, 1 ♀.

Ischnomyrmex longipes Sm.

Tjiapoes bei Buitenzorg, W. Java, 15. I. 1913, W. Karawajew, Nr. 2422, ♂♂ und ☿☿ aus einem morschen Baumstumpf.

Auf Java soll nach Emery die typische Form vorkommen, indessen bei meinem Exemplare ist der Halsabschnitt des Kopfes bei den ☿ doch kaum kürzer als das nach der Abbildung von Emery (Ann. Mus. Stor. Nat. Genova, vol. 40, 1901, p. 681, Fig. 7) bei dem Typus sein soll. Ebenda bemerkt Emery dass die Exemplare aus Birmanien (Fea) „sono intermedii fra il tipo e la var. *conicollis*".

Von Viehmeyer besitze ich einen ♂ und ☿ von *Ischnomyrmex* aus Malakka (von H. Buttel-Reepen gesammelt?), welcher von ihm als zu der var. *conicollis* Em. angehörend bestimmt ist, indessen zwischen der Halsbildung dieses ☿ und des Typus finde ich keinen Unterschied und betrachte diese Exemplare als zu dem Typus angehörend.

Myrmicaria arachnoides Sm. (Pl. 2*e-f*).

Depok, W. Java, W. Karawajew, Nr. 2289, ☿☿, geflüg. und flügellose ♀♀ und zahlreiche ♂♂. — Tjiampea bei Buitenzorg, Java, Derselbe, Nr. 2389, 6 ☿. — Buitenzorg, Derselbe, Nr. 2269. 7 Nester, mit einem Teil der Bevölkerung derselben; in dem grössten dieser Nester (11,5 cm lang) erwiesen sich 5 Königinnen, in einem etwas kleineren deren 3. — Tjiapoes bei Buitenzorg, Derselbe, Nr. 5376, 2 ☿.

Die folgende Beschreibung bezieht sich auf die Exemplare von Depok.

☿. Kopf kaum länger wie breit (1,23 mm breit), vorn bedeutend schmäler, mit geraden, kaum konkaven, Seiten und breit bogenförmig abgerundetem Okzipitalrand. If = etwa 4. Stirnfeld dreieckig, stark eingesenkt, aber ohne eine unterscheidbare Naht. Augen breit oval, sehr stark gewölbt; deren Längsdurchmesser bei Ansicht des Kopfes von vorn deutlich kürzer als der Abstand von der Vorderecke des Kopfes. Scapus schlank (1,92 mm), den Okzipitalrand um beinahe ⅔ seiner Länge überragend. Das 1. Funiculusglied 1,48 mm lang, das 2. 0,52, das 3. 0,35, der gesamte Funiculus 2,55 mm.

Thorax mit stark hervorragenden oberen Beulen des Pronotums, welche vor dem trapezförmigen, durch dunkel pigmentierte rippige Runzel abgegrenzten, Mesonotumschild gelegen sind; sie sind am deutlichsten bei schiefer Orientierung des Thorax. Vor der vorderen queren Runzel des Mesonotumschildes liegt eine tiefe Rinne, welche der eigentlichen vorderen Grenze des Mesonotums entspricht; eine deutliche Naht befindet sich nur seitlich, oben in ein grosses ovales Stigma mündend. Eine untere stumpfwinkelige Beule des Pronotums ist nur bei seitlicher Orientierung des Thorax gut unterscheidbar. Zwischen Mesonotum und

Epinotum eine tiefe Einsenkung, ohne jegliche Spur einer Naht; eine solche befindet sich nur seitlich, das winzige Stigma nicht erreichend. Epinotumdornen allmählich zugespitzt, kaum divergent, etwas nach oben gerichtet; der Abstand deren Spitzen vom Grund der Ausbuchtung 0,38 mm. Petiolus mit langem schlanken vorderen Abschnitt, welcher vor dem Knoten in horizontaler Richtung etwas eingeschnürt ist; dessen Knoten hoch abgerundet, doppelt so breit wie der vordere Abschnitt vor der Einschnürung. Der Postpetiolus wiederholt in seiner Form den Petiolus, nur ist sein vorderer verjüngte Abschnitt viel kürzer; von oben betrachtet, erscheint der Postpetiolusknoten kaum breiter als der des Petiolus; sein vorderer Abschnitt ist etwas breiter als derselbe des Petiolus.

Der gesamte Körper ist im allgemeinen sehr glatt und glänzend, mit spärlichen äusserst feinen dunkel gefärbten rippigen Runzeln, welche fast ausschliesslich auf dem Thoraxrücken entwickelt und auf unserer Abbildung dargestellt sind. Die Seiten des Meso- und Metathorax sind feinst, wellig, sehr dicht längsgestrichelt. Färbung hell, gelblich ockerfarben. Mit langen mässig dicht entwickelten anliegend-abstehenden Haaren, welche auf der Gaster reichlicher werden. — L. beinahe 7 mm. Femur des III. Beinpaares 2,66 mm, Tibia 2,41, Tarsus 2,45.

♀. Kopf kaum breiter wie lang, vorn bedeutend schmäler, mit geradem Okzipitalrand und abgerundeten Hinterecken. If = beinahe 4. Scapus um etwa die halbe Länge den Okzipitalrand überragend.

Thorax etwa 1,6 mal so lang wie das Mesonotum hoch; das letztere stark aufgetrieben; sein vorderes Profil ragt mit der hinteren Hälfte des Pronotums senkrecht hinauf. Das Scutellum sehr stark wulstartig aufgetrieben, oval, kaum breiter wie lang, mit einer schwachen Andeutung einer Längsrinne. Epinotumdornen allmählich zugespitzt, gerade, bis zum Grund der Ausbuchtung gemessen 0,42 mm lang, nach hinten gerichtet, kaum divergent. Petiolus und Postpetiolus ähnlich wie beim ☿, deren Knoten gleich breit.

Skulptur und Behaarung wie beim ☿. Färbung ebenfalls, nur der Kopf in der Gegend der Ocellen und das Mesonotumschild sind eigenartig gezeichnet: auf einem gelbbraunen Grund befinden sich drei längliche gelbe Flecke — ein mediales vom Vorderrand des Schildes bis über dessen Mitte etwas nach hinten reichend und ein Paar seitlicher, welche vom Hinterrand bis über die Mitte des Schildes sich etwas nach vorn erstreckend; auf jedem der drei gelben Flecke eine mediane feine braune Linie. Scutellum braun und ausserdem einige gelblichbraune Flecke auf den Seiten des Thorax. Flügel gelblich. — L. 11 mm, L. der Vorderflügel 8,5 mm.

♂. Kopf (mit den Augen) 1,33 mm breit, (ohne Ocellen) 0,77 mm lang. Die ovalen, im Profil beinahe halbkreisförmigen, Augen nehmen die ganze Kopfseite (ohne den seitlichen Clypeusabschnitt) ein; hinter denselben ist der Okzipitalrand breit bogenförmig; Ocellen auf stark hervorragender Basis sitzend. Vorderrand des Clypeus gerade. Mandibeln lang, sichelförmig zugespitzt. Scapus 0,84 mm lang, Funiculus 3,25, 1. Funiculusglied beinahe halb so lang wie das 2., das letztere beinahe 1½ soviel wie das 3.

Pronotumprofil vorn senkrecht, in der Mitte eingebuchtet. Mesonotum mässig gewölbt, Scutellum viel stärker. Epinotumbewaffnung in Form kleiner dreieckiger Wärzchen. Petiolus doppelt so lang wie der Postpetiolus (unten gemessen), die Knoten schwach abgesondert, oben breit bogenförmig begrenzt. Die herausgestülpten Genitalien, rückwarts umgebogen, dem Gaster gleich lang. Lamina subgenitalis dreieckig. Die Form der Genitalanhänge sieht man an der entsprechenden Abbildung ohne besondere Beschreibung.

Glatt und glänzend. Fahlgelb mit ebensolcher ziemlich dichter langen anliegend-abstehenden Behaarung. Flügel ebenso fahlgelblich. — L. 7 mm, L. der Vorderflügel 5,5 mm.

Die oben genannten ☿☿ von Tjiapoes (Nr. 5371) und Buitenzorg (Nr. 2269) unterscheiden sich von den von mir beschriebenen Exemplaren so beträchtlich dass man sie nach der in der Myrmekologie eingebürgerten Betrachtungsweise als besondere Varietäten beschreiben könnte, das Material scheint mir aber dazu noch ungenügend zu sein, besonders da Mayr (Tijdschr. Entom., Dl. 10, 1867 p. 115), die Färbung von *arachnoides* (= *longipes* Sm.) als „rufo-castanea" bezeichnet.

Die ☿☿ von Tjiapoes und Buitenzorg sind dunkelbraun gefärbt, besonders dunkel die ersteren, wobei dieselben auch besonders glänzend sind. Bei den einen und den anderen sind nur die drei letzten Glieder des Funiculus gelblich.

Bei den ☿☿ von Tjiapoes sind die Seiten des Kopfes deutlich konkav begrenzt, bei denen von Buitenzorg gerade. Bei den ersteren sind die Epinotumdornen durchaus parallel orientiert, bei den letzteren divergent.

Die Thoraxlänge der ☿☿ von Tjiapoes ist 1,75 mm, Kopflänge 1,55, Kopfbreite 1,085, Länge der Epinotumdornen bis zum Grund der Ausbuchtung gemessen 0,28 mm.

Die Thoraxlänge der ☿☿ von Buitenzorg ist 1,575, Kopflänge 1,015, Kopfbreite 0,91, Länge der Epinotumdornen 0,21.

Die Beschaffenheit des Nestes. Die Wände des Nestes von *M. arachnoides* bestehen aus einer groben spröden Kartonmasse, welche dem Aussehen nach dem ausgetrockneten Kuhmist ähnlich aussieht. Das Nest wird auf der Unterseite von grossen oder kleinen Baumblättern gebaut und besteht aus einer Anzahl von mehr oder weniger sichelförmigen Kammern, welche allmählich durch Apposition gebaut werden und deren Innenraum von demselben der Nachbarkammern anfänglich abgetrennt ist, später aber teilweise durch Ausnagen der trennenden Wand in Verbindung gestellt wird. Die Nestwand ist ziemlich dünn und brüchig. Das Nest hat im allgemeinen die Form eines mehr oder weniger gewölbten Ovals, mit einer Anzahl von Eingangsöffnungen auf der Oberfläche und manchmal an der Seitengrenze, dicht an der Oberfläche des Baumblattes. Wenn die neue Kammer noch nicht ganz fertig ist, so hat die Eingangsöffnung eine sichelförmige Form und ist sehr breit, dagegen eine solche einer fertigen Kammer ist ziemlich abgerundet und hat einen Durchmesser von ca 4-8 mm. Die Anzahl der Eingangsöffnungen ist geringer und manchmal sogar viel geringer als die Anzahl der Kammern, die dann teilweise, wie oben

gesagt, miteinander verbunden sind. Das grösste meiner Nester hat einen Längsdurchmesser von 11,5 cm, das kleinste 7 cm. Im Ganzen habe ich 6 Nester. Das grösste Nest ist auf Pl. 2 bei *e* in ½ natürlicher Grösse abgebildet. Abb. *f* auf derselben Tafel stellt ein anderes, etwas kleineres, Nest von der Innenseite dar, welches von der Oberfläche des Blattes abgetrennt ist; man sieht gut die Zwischenwände der Kammern; dieses Nest, welches 9 Kammern besitzt, hat nur 4 Eingangsöffnungen; die eine davon sieht man auf der photographischen Aufnahme links; sie entspricht der ersten und offenbar ältesten Kammer, welche mit der Nachbarkammer in keiner Verbindung steht.

Myrmicaria arachnoides SM. var. **lutea** EM. (Abb. 9).

Buitenzorg, Java, W. KARAWAJEW, 21. XII. 1912, Nr. 2325, zahlreiche ☿☿, 1 geflüg. ♀ und 3 ♂.

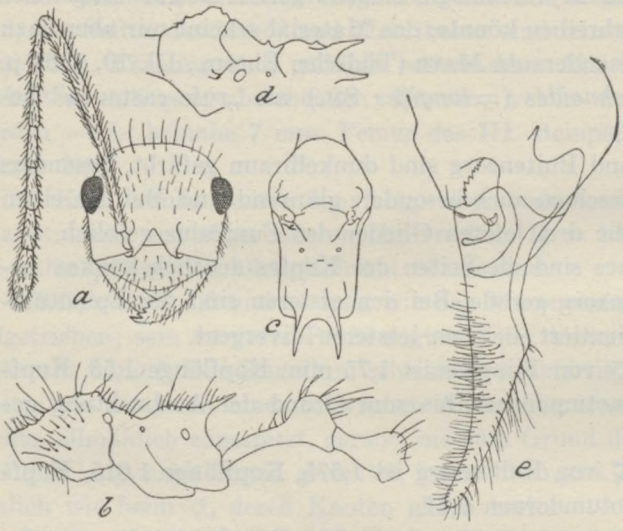


Abb. 9. — *Myrmicaria arachnoides* SM. var. *lutea* EM. *a-d* ☿, *e* ♂, *a* Kopf, *b* Thorax und Stielchen in seitlicher Ansicht, *c* Thorax von oben, *d* derselbe bei schiefer Orientierung, *e* Genitalanhänge des ♂.

Ich denke eben diese Exemplare zu der var. *lutea* stellen zu müssen, da deren ☿☿ besonders rein gelblich-ockerfarben sind, wogegen die oben als *arachnoides* beschriebenen mehr oder weniger bräunlich sind.

☿. Besonders kräftig gebaut, gelblich-ockerfarben. Sehr glänzend, lang abstehend behaart. Allgemeine Körperlänge 7 mm. Thoraxlänge 2,1 mm, Kopflänge 1,36, Kopfbreite 1,43, Hinterfemur 2,97, Hintertibia 2,8, Scapus, 2,205, Funiculus 2,905, 1. Funiculusglied 0,45, 2. Glied 0,59, 3. Glied 0,42 mm.

♀ (neu). Etwas lichter als der ☿ gefärbt. Die für *arachnoides* auf dem Mesonotum beschriebene Zeichnung ist nur durch bräunliche Umrisse auf gelbem Grund angedeutet. — L. 10 mm, L. der Vorderflügel 9 mm.

♂ (neu). Fahlgelb. L. 7,5 mm, L. der Vorderflügel 6 mm.

Myrmicaria brunnea brunnea SAUND. (Abb. 10).

Ich gebe im folgenden eine ausführliche Beschreibung dieser Art.

☿. Kopf kaum breiter wie lang (1,75 mm breit, 1,68 lang), vorn deutlich schmäler, mit geradem Okzipitalrand, stark abgerundeten Hinterecken und etwas gewölbten Seiten. Stirn breit, mit breiten Stirnlappen, welche vorn zapfenförmig vorspringen und hinten ziemlich eingeschnürt sind; die Stirnleisten gehen in eine feine dunkle Runzel über, welche sich halbkreisförmig nach vorn umbiegt;

das Stirnfeld ist ganz undeutlich. Clypeus in beiden Richtungen schwach gewölbt, mit breit bogenförmigem Vorderrand. Mandibeln 4-zähnig, mit grösserem Abstand zwischen dem 1. und 2. Zahn. Der 1,78 mm lange Scapus überragt den Okzipitalrand beinahe um seine halbe Länge; Funiculus 1,85 mm lang, L. der Funiculusglieder: 0,31, 0,42, 0,35, 0,38, 0,73. Die ovalen Augen sind mässig gewölbt; deren Längsdurchmesser bei Ansicht des Kopfes von vorn ist etwa halb so lang wie der Abstand derselben von der Vorderecke des Kopfes.

Thorax 2,22 mm lang. Pronotum unten mit einem Paar ziemlich langer zapfenförmiger Vorsprünge; mit dem Mesothorax bildet es ein solides Stück, welches von dem letzteren seitlich und oben durch eine feine deutliche Naht getrennt ist. Oben ist das Promesonotum etwas abgeplattet, wobei diese Plattform auf der Mitte des Mesonotums durch ein Paar etwas abgeplatteter divergierender dreieckiger Vorsprünge abgegrenzt wird (Abstand deren Spitzen 0,4 mm); nach vorn divergiert die Plattform geradlinig bis zum Seitenrand des Pronotums, woselbst sie eine stumpfe Spitze bildet. Zwischen Metathorax und Epinotum ist die Naht tief eingesenkt, wobei die kielförmigen tiefbraun pigmentierten seitlichen Grenzen der Basalfläche des Epinotums, welche an der Mesoepinotumnaht eingeschnürt werden, sich erweiternd, die oben erwähnten Vorsprünge seitlich abgrenzen; es bildet sich hier eine trapezförmige abschüssige Plattform, deren kurze Seite der Mesoepinotum-Naht entspricht. Die Epinotumdornen sind lang, dünn, gerade, spitz, etwas divergent, mässig hinaufgerichtet; der Abstand deren Spitzen vom Grund der Ausbuchtung zwischen deren Basis ist 0,52 mm. Die Form der Stielchenglieder ist an der entsprechenden Abbildung ohne Beschreibung zu sehen. Der Petiolus- und Postpetiolusknoten sind etwa 2½ mal so breit wie der vordere verjüngte Abschnitt des Petiolus.

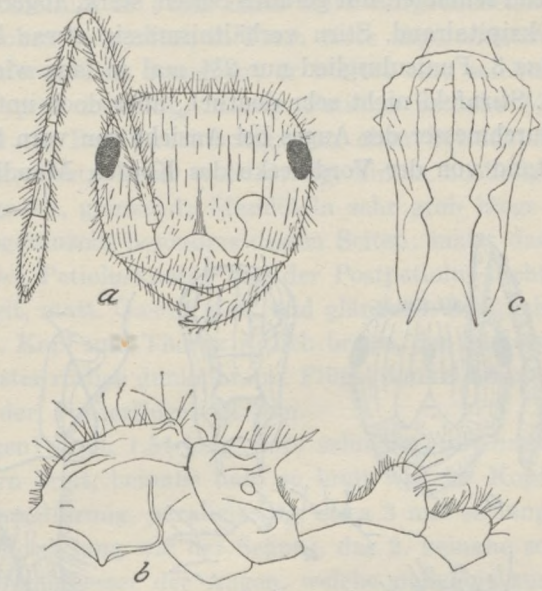


Abb. 10. — ♀ von *Myrmicaria brunnea brunnea* Saund. *a* Kopf, *b* Thorax und Stielchen in seitlicher Ansicht, *c* Thorax von oben.

Mandibeln scharf und dicht längsgestreift. Kopf glatt und glänzend mit ziemlich weit abstehenden feinen, rippigen, scharfen, dunkelbraun pigmentierten Längsrunzeln. Thorax mit ebensolchen Runzeln, welche auf dem Mesosternit ziemlich dicht angeordnet sind. Auf dem Pronotum und Mesonotum, hauptsächlich auf der Grenze der Plattform, befinden sich einige kleine haartragende erhabene Wärzchen. Stielchenglieder ganz glatt und glänzend. Gaster — ebenfalls.

Anliegende ziemlich lange Haare nur auf der Oberseite der Gaster mässig entwickelt, übrigens wie abwesend. Lange abstehende Haare auf dem ganzen Körper und den Anhängen ziemlich reich entwickelt. Rötlich braun, die Knoten der Stielchenglieder und die Gaster dunkelbraun. — Die maximale Länge meiner ziemlich monomorphen Exemplare 8,5 mm. Nach BINGHAM (The Fauna of British India) schwankt die Länge der ☿☿ zwischen 5,5 und 8 mm.

Ceylon, O. JOHN, 1912, zahlreiche ☿☿. Nr. 5369 meiner Sammlung.

Verbreitung: Indien, Ceylon, Sumatra (?).

Myrmicaria brunnea subcarinata SM. (Abb. 11).

☿. Kopf 1,08 mal so breit wie lang (1,33 mm breit, 1,23 lang), vorn bedeutend schmäler, mit geraden Seiten, stark, abgerundeten Hinterecken und geradem Okzipitalrand. Stirn verhältnismässig etwas länger als bei der Nominatrasse, das 3. Funiculusglied nur 2½ mal so lang wie breit, etwa ebenso lang wie das 2. Stirnfeld nicht sehr deutlich, aber doch unterscheidbar, vertieft. Der Längsdurchmesser des Auges bei Ansicht von vorn beinahe halb so lang wie der Abstand von der Vorderecke des Kopfes. Mandibeln 4-zähnig.

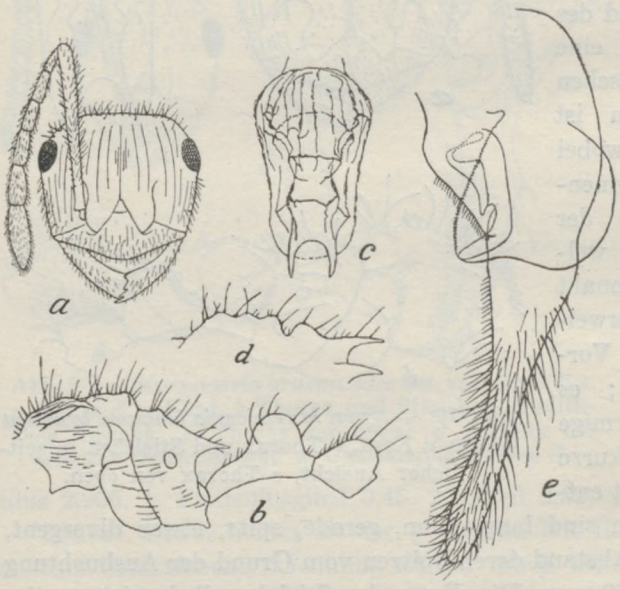


Abb. 11. — *a-d* ☿ von *Myrmicaria brunnea subcarinata* SM., *e* deren ♂.

Thorax 1,75 mm lang, ähnlich wie bei der Nominatrasse, aber die Epinotumdornen bedeutend kürzer, nach hinten gerichtet, divergent; die unteren Vorsprünge des Pronotums verhältnismässig etwas mehr ausgebildet, aber bei Ansicht des Thorax von oben unsichtbar. Bei Betrachtung des Thorax in schiefer Stellung erscheinen die seitlichen Erhabenheiten des Pronotums und Mesonotums mehr entwickelt. Die seitliche Naht zwischen dem Pro- und Mesothorax nur auf ⅔ Höhe vorhanden, oben die Grenze zwischen beiden nur durch eine tiefe Einsenkung angedeutet. Das Petiolusstielchen bedeutend kürzer als bei der Nominatrasse, aber der Knoten desselben und der Postpetiolus ebenso stark ausgebildet wie bei der Nominatrasse; Petiolusknoten 2½ mal so breit wie dessen Stielchen; Postpetiolus noch etwas breiter. Runzelung kaum dichter als bei *brunnea brunnea*, Behaarung ebenfalls. Farbe wie bei der Nominatrasse; bei meinen Exemplaren ist die Gaster nicht dunkler. — L. etwa 5,5-6 mm.

♀. Kopf 1,13 mal so breit wie lang, vorn bedeutend schmäler, mit breitem geraden Okzipitalrand und abgerundeten Hinterecken. Stirn halb so breit wie der Kopf, kaum eingeschnürt; die Runzeln, in welche hinten die Stirnleisten übergehen, divergent; Stirnfeld eingesenkt, dessen Grenzen aber nicht unterscheidbar. Scapus um das ⅓ seiner Länge über den Okzipitalrand hinausreichend. Mandibeln, wie beim ☿, 4-zähnig. Der Längsdurchmesser der Augen ist bei Ansicht des Kopfes von vorn dem Abstand von der Vorderecke des Kopfes gleich, in Wirklichkeit noch grösser. Die hinteren Ocellen liegen dicht dem Okzipitalrand an, wobei zwischen denselben der letztere konkav ist.

Thorax (ohne die Dornen) kaum länger wie hoch. Mesonotum hoch aufgetrieben, mit dem senkrechten Profil des Pronotums einem Bogen bildend, welcher vorn mehr gewölbt ist. Scutellum in Form eines stark aufgetriebenen queren Wulstes; der letztere, von oben betrachtet, in Form eines abgerundeten Trapez, bildet eigentlich den mittleren Teil desselben; er besitzt eine seichte mediane Rinne. Epinotumdornen spitz dreieckig, mässig. Petiolus beinahe ⅔ so hoch wie lang; dessen Knoten im Profil rechteckig, von oben betrachtet dreieckig, abgerundet, hinten breit; Postpetiolus wulstförmig, hinten buckelig.

Kopf dicht rippenförmig gerunzelt, glänzend; Mandibeln sehr grob längsgerunzelt. Thorax sehr dicht längsgerunzelt, besonders dessen Seiten; matt; das Scutellum netzförmig gerunzelt. Der Petiolusknoten und der Postpetiolus dicht und scharf längs- und quergerunzelt, matt. Gaster glatt und glänzend. Ziemlich dicht anliegend-abstehend behaart. Kopf und Thorax rötlich braun, der letztere heller. Stielchenglieder dunkler. Gaster rötlich dunkelbraun. Flügel dunkel bräunlich getrübt. — L. 10,5 mm. L. der Vorderflügel 12 mm.

♂. Kopf 2,1 mm (mit den Augen) breit, 1,54 lang, vorn schmäler, mit breit bogenförmigem Okzipitalrand. Stirn breit, beinahe halb so breit wie der Kopf bis zu den Augen. Mandibeln stummelförmig, parallelseitig, etwa 3 mal so lang wie breit. 1. Glied des Funiculus ⅓ so lang wie der Scapus, das 2. beinahe so lang wie der letztere. Der Längsdurchmesser der Augen, welche nahe bis zur Vorderecke des Kopfes reichen, ist 0,87 mm.

Thorax im allgemeinen ähnlich wie beim ♀. Scutellum weniger stark aufgetrieben, ohne Medianfurche. Epinotum mit stumpfen Beulen. Petiolusknoten oben flach, etwa halb so lang und beinahe ⅓ so hoch wie der ganze Petiolus, oberhalb der Artikulation mit dem Postpetiolus nach hinten etwas hervortretend, doppelt so breit wie der vordere Abschnitt hinten; von oben betrachtet, länglich rhomboidal, abgerundet. Postpetiolus im Profil hinten breiter, gleich hoch wie der Petiolus; die hintere Artikulationsfläche schief, von oben betrachtet sehr länglich eiförmig, gleich breit wie der Petiolusknoten. Gaster, von oben betrachtet, sehr breit herzförmig. Lamina subgenitalis ausgeschnitten. Die Beschaffenheit der Genitalanhänge sieht man an der entsprechenden Abbildung ohne spezielle Beschreibung.

Sehr fein und dicht längsgestrichelt, halbglänzend, die Gaster ziemlich glatt und glänzend. Dicht anliegend-abstehend behaart, die Gaster etwas weniger dicht und kürzer behaart. Rötlich dunkelbraun, die Flügel bräunlich geräuchert,

etwas weniger als beim ♀ — L. 12 mm (bei umgebogener Spitze der Gaster). L. der Vorderflügel 8,5 mm.

Bei langem Verbleiben der Ameisen (samt ♀♀ und ♂♂) in Alkohol hat sich der letztere stark dichroisch gefärbt: bei durchfallendem Licht rötlich-braun, bei reflektiertem gelblich-grün, ähnlich wie eine Eosinlösung.

Tjibodas, Java, 1400 m, W. KARAWAJEW, I. 1910, zahlreiche ☿☿ und geflüg. ♀♀. — Buitenzorg, Java, Derselbe, Nr. 5388, zahlreiche ☿☿, geflüg. ♀♀ und ♂♂. — Tjiapoes bei Buitenzorg, Derselbe, Nr. 2425, einige ☿☿.

Verbreitung: Malayische Inseln, Indo-China.

ANHANG ZU *MYRMICARIA*. BESTIMMUNGSTABELLE NACH DEN ARBEITERN FÜR DIE INDO-MALAYISCHEN UND PAPUANISCHEN ARTEN.

(Nach F. SANTSCHI, mit einer kleinen Aenderung).

1. Sehr schlanke Formen. Mandibeln glatt und glänzend 2.
— Kräftiger gebaut. Mandibeln längsgerunzelt 5.
2. Kopf als Regel länger wie breit, ausnahmsweise kaum breiter wie lang. 3.
— Kopf durchaus breiter wie lang 4.
3. Rötlich gelbbraun oder mehr bräunlich. Java und Borneo *M. arachnoides* EM.
— Hellgelb. Java *M. arachnoides* var. *lutea* EM.
— Braun. Gaster gelb. Sumatra *M. arachnoides* var. *luteiventris* EM.
4. Rotgelb. Kopf und Gaster oben bräunlich. Borneo ... *M. melanogaster* EM.
— Bräunlich. Gaster gelblich. Birmanien *M. birmana* FOR.
5. Kopf dicht gestreift. Neuguinea *M. rugosa* SM.
— Kopf schwach gerunzelt, in der Mitte beinahe glatt 6.
6. Das 3. Funiculusglied etwa 4 mal so lang wie dick. Epinotumdornen gerade und mehr hinaufgerichtet. Indien 7.
— Das 3. Funiculusglied kürzer. Die Dornen weniger lang und etwas nach unten gebogen. Malayische Region 8.
7. Dunkelbraun. Kopf schmäler *M. brunnea* SAUND.
— Rotgelb, Gaster dunkler *M. brunnea* var. *fodiens* JERD.
8. Braun, kräftiger gebaut. Clypeus deutlich gekielt. Thoraxrunzeln mehr hervorragend. Borneo *M. brunnea carinata* SM.
— Rotbraun, Gaster oft dunkler, Runzeln schwächer *M. brunnea subcarinata* SM.
— Ganz kastanienbraun. Kopf hinten breiter. Antennen kürzer. Pronotum weniger gestreift. 5 mm. Sumatra *M. castanea* CRAWLEY (1924).

Cardiocondyla nuda MAYR (Abb. 12).

Die unten beschriebenen Exemplare, die ich zu der Art *nuda* rechne, unterscheiden sich in manchen nebensächlichen Merkmalen von den vorhandenen Diagnosen von *nuda*, man muss aber berücksichtigen dass die Diagnose von MAYR sehr oberflächlich ist und dieselbe von FOREL (Mitth. Münch. Ent. Ver.,

Bd. 1, 1881, p. 6), obschon bedeutend ausführlicher, doch viele Punkte unerwähnt lässt. Deswegen gebe ich im Folgenden eine möglichst ausführliche Beschreibung meiner Exemplare.

☿. Kopf 1,3 mal so lang wie breit (0,55 mm lang, 0,44 mm breit), mit parallelen, schwach gewölbten, Kopfseiten, in der Mitte geradem Okzipitalrand und ziemlich abgerundeten Hinterecken. Der Clypeus ist in der Längsrichtung stark bogenförmig gewölbt, dessen mittlere Abschnitt stark breit trapezförmig vorgestreckt, der Vorderrand kaum konkav. Die ziemlich langen Stirnlappen etwas nach hinten konvergent; der dreieckige Abschnitt des Clypeus, welcher zwischen die Stirnlappen hineinragt, ist seitlich undeutlich abgegrenzt. Der Längsdurchmesser der sehr breit ovalen, beinahe rundlichen, Augen ist dem Abstand bis zum hinteren Clypeusrand gleich. Die Mandibeln mit 3 grösseren vorderen Zähnen und 3 winzigen dahinter. Der Scapus (0,22 mm lang) erreicht nicht den Okzipitalrand um die Dicke an seinem Ende. Das 2. Funiculusglied ist, wie bei den übrigen, mir bekannten, Arten etwas länger als das folgende; das Endglied ist dick, so lang wie die 4 vorhergehenden zusammengenommen, etwa 2½ mal so lang wie das vorhergehende.

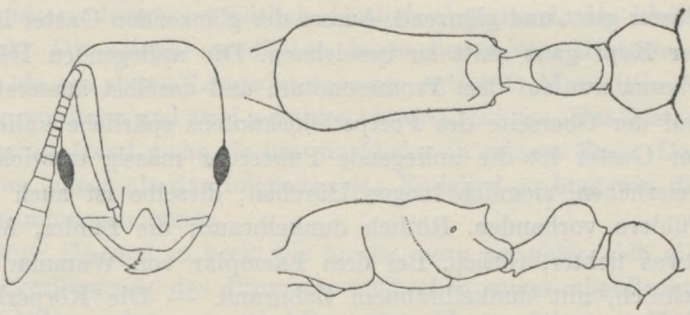


Abb. 12. — ☿ von *Cardiocondyla nuda* Mayr.

Der Thorax ist vorn 1½ mal breiter als hinten, länglich birnförmig. Das Pronotum ist in der Querrichtung flach bogenförmig begrenzt und bildet mit der Seitenfläche sehr abgerundete, aber doch wahrnehmbare, Kanten und vorn ebenfalls abgerundete Beulen. Der Thoraxrücken verläuft ziemlich geradlinig, mit einer sehr schwachen Einsenkung an der Grenze des Mesonotums und Epinotums. Eine mehr oder weniger deutliche, eingesenkte, Naht verläuft nur etwa auf ⅔ Höhe der Seitenflächen zwischen dem Prothorax und Mesothorax. Die Grenze zwischen dem Mesothorax und Epinotum ist seitlich nur durch eine schwache Einschnürung angedeutet, auf deren Grund, ganz unten, an das Metasternit angrenzend, eine Naht sichtbar ist, welche in einen Ausschnitt mündet. Eine weitere schräge Einsenkung verläuft zwischen der Metathorakaldrüse und dem Rand der abschüssigen Fläche des Epinotums in der Richtung der Stigme, dieselbe doch nicht erreichend. Die Epinotumdornen sind dreieckig, unter 45° gestellt; der Abstand deren Spitzen ist etwas kürzer als die Breite des Petiolusknotens. Von den Epinotumdornen an wird die konkave abschüssige Fläche des Epinotums seitlich durch scharfe leistenartige Kanten begrenzt, welche aber bei meinem Exemplar von Makassar viel weniger entwickelt sind. Der Petiolus ist mit einem ziemlich langen Stiel, welcher vorn, unten, mit einem kleinen Zöpfchen versehen ist. Der Knoten ist oben in Profilansicht abgerundet. Der Postpetiolus

ist bei Ansicht von oben an den Seiten etwas eckig, 1⅓ mal so breit wie lang, beinahe doppelt so breit wie der Petiolusknoten.

Der Kopf ist verhältnismässig ziemlich grob fingerhutförmig punktiert, mit in den Punkten sitzenden kurzen mikroskopisch feinen Härchen. Mandibeln der Länge nach feinst gestrichelt, mit kurzen anliegenden Härchen; auf dem Vorderrand des Clypeus einige längere Haare. Das Promesonotum etwas unregelmässiger netzartig skulpturiert; der Thorax übrigens fein punktiert; die abschüssige Fläche zwischen den seitlichen Kanten glatt und glänzend. Die Stielchenglieder sind sehr unregelmässig, äusserst fein, punktiert-genetzt. Die Gaster glatt und glänzend. Ausser der glänzenden Gaster ist das Tier halbmatt, der Kopf ganz matt zu bezeichnen. Die anliegenden Härchen sind auf dem Thorax nur auf dem Promesonotum und daselbst äusserst spärlich vorhanden. Auf der Oberseite des Postpetiolusknotens spärliche anliegende Härchen. Auf der Gaster ist die anliegende Pubeszenz mässig entwickelt und besteht aus weisslichen, ziemlich langen Härchen; dieselbe ist auch auf den Beinen und Fühlern vorhanden. Rötlich dunkelbraun; die Fühler, Mandibeln und Beine etwas lichter, rötlich. Bei dem Exemplar von Wammar sind die Mandibeln gelblich, mit dunkelbraunem Zahnrand. — Die Körperlänge (bei geneigtem Kopf) ist bei dem Exemplar von Tjibodas 2 mm, bei den 2 übrigen (Makassar und Wammar) je 1,5 mm.

Soweit ich nach der Beschreibung von FOREL urteilen kann, unterscheiden sich meine Exemplare von den seinigen in folgenden Punkten: *nuda:* „Clypeus matt, in der Mitte leicht konvex, ziemlich grob längsmaschig genetzt und gerunzelt, gleich den flachen, horizontalen, vom Clypeus nicht abstehenden Stirnleisten." FOREL sagt nichts von der Ausrandung am Vorderrand des Clypeus. Der Clypeus ist bei meinen Exemplaren deutlich feiner als der übrige Kopf skulpturiert und nicht längsmaschig. „Zweiter Knoten... ebenso lang als breit, oval viereckig, hinten wenig verengt". Bei meinen Exemplaren anders geformt. „Mandibeln zerstreut punktiert, fein gestreift, kurz behaart. Wangen längsgerunzelt.... Oben am Metanotum ist die fingerhutartige einfache Punktierung ausgesprochener und deutlich feiner als die Grübchen des übrigen Thorax...." Bei meinen Exemplaren sind die Mandibeln ohne Punktierung, die Wangen ohne Längsrunzelung, am schärfsten und gröbsten ist die Skulptur des Kopfes; oben auf dem Epinotum (bei FOREL nach der älteren Auffassung als Metanotum bezeichnet) ist die Punktierung nicht fingerhutartig, sondern einfach. „Rötlich bis schwarzbraun; Kopf bräunlich bis schwarz. Mandibeln, Fühler und Beine bräunlich gelbrot; Fühlerkeule häufig schwärzlich". Mit Aushnahme der etwas lichteren Mandibeln, Antennen und Beinen sind meine Exemplare gleichmässig rötlich dunkelbraun gefärbt.

Die Art *nuda,* welche in eine Reihe von weit verbreiteter Unterarten und Varietäten (Australien, Nordafrika, Aegypten, Sudan, Cypern, Hawaii-Inseln, Madagaskar) zerfällt, wird in ihrer typischen Form für Indien, Malayische, Tonga- und Samoainseln angegeben.

Tjibodas, W. Java, W. Karawajew, Nr. 5374, 1 ☿. — Makassar, S. Celebes, Derselbe, Nr. 2435, 1 ☿. — Wammar, Aroe Archipel, Derselbe, Nr. 2588, 1 ☿.

Cardiocondyla tjibodana sp. n. (Abb. 13).

☿. Kopf 1,32 mal so lang wie breit (0,45 mm lang, 0,34 mm breit), parallelseitig, mit schwach gewölbten Seiten, stark abgerundeten Hinterecken und in der Mitte geradlinigem Okzipitalrand. Der mittlere Abschnitt des Clypeus ist breit trapezförmig vorgestreckt und am Vorderrand deutlich konkav. Die Stirnleisten divergieren nach hinten. Der dreieckige Abschnitt des Clypeus, welcher zwischen die Stirnlappen eindringt, ist seitlich deutlich abgegrenzt, das kleine Stirnfeld tief eingesenkt. Die beinahe rundlichen Augen liegen vom Hinterrand des Clypeus weniger als um deren Längsdurchmesser entfernt. Mandibeln 5-zähnig, mit 3 grösseren vorderen und zwei winzigen hinteren Zähnen. Der Scapus erreicht nicht den Okzipitalrand mehr als um die Dicke an seinem Ende. Das 2. Funiculusglied etwas länger als das folgende; das Endglied so lang wie die 7 vorhergehenden zusammengenommen.

Der Thorax ist vorn 1½ mal so breit wie hinten, vorn gerundet, sich allmählich nach hinten verjüngend; das Promesonotum oben etwas abgeflacht; vorn einigermassen Schulterbeulen unterscheidbar. Der Thoraxrücken verläuft von der Mitte des Pronotums bis zur Mitte der Basalfläche des Epinotums ganz geradlinig; die seitlichen Nähte — wie bei *nuda;* die entsprechenden Einschnürungen kaum angedeutet. Die Epinotumdornen dreieckig, wie bei *nuda;* die Entfernung deren Spitzen von einander etwas grösser als die Breite des Petiolusknotens. Das Stielchen des Petiolus etwas kürzer als *nuda,* der Knoten oben beinahe geradlinig abgestutzt; am Stielchen unten vorn ein kleines Zäpfchen. Der Postpetiolus queroval, beinahe doppelt so breit wie der Postpetiolusknoten.

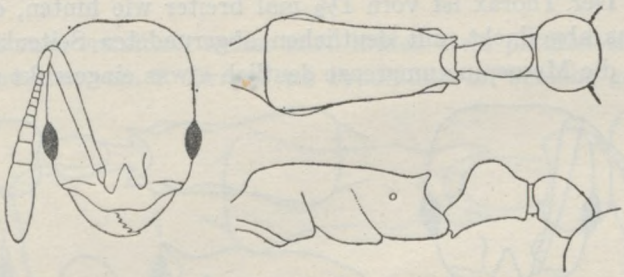


Abb. 13. — ☿ von *Cardiocondyla tjibodana,* sp. n.

Sehr fein, besonders der Thorax, punktiert-genetzt, mit aus den Punkten, hauptsächlich auf dem Kopf und Thoraxrücken, hervorragenden mikroskopisch sichtbaren kurzen Härchen; auf dem Vorderrand des Clypeus und auf den Mandibeln längere Härchen. Die Stielchenglieder noch feiner netzartig skulpturiert. Der Kopf und Thorax matt, die Stielchenglieder halbglänzend. Gaster sehr glatt und glänzend. Auf der letzteren eine spärliche Pubeszenz aus längeren Härchen; eine solche auch auf den Hüften, Beinen und Antennen. Gelblich rötlich braun gefärbt, die Gaster tief dunkelbraun. — Körperlänge mit geneigtem Kopf etwa 1,5 mm, Thoraxlänge 0,5 mm.

Erinnert einigermassen an *nuda.*

Tjibodas, W. Java, W. KARAWAJEW, Nr. 5375, 1 ♀. — Küste von Bantam, Java, an der Sundastrasse, gegenüber Meeuwen Eiland, 7. I. 1913, Nr. 5376, 1 ♀. Zwischen alang-alang-Gras (*Imperata arundinacea*) auf dem Bodem. Bei diesem Exemplar ist die Skulptur des Kopfes etwas deutlicher fingerhutartig.

Cardiocondyla longispina sp. n. (Abb. 14).

♀. Kopf 1,2 mal so lang wie breit (0,45 mm lang, 0,38 mm breit), hinten deutlich etwas breiter, mit mässig gewölbten Seiten, abgerundeten Hinterecken und breitem geradlinigen Okzipitalrand, welcher sogar bei richtiger Einstellung des Kopfes kaum konkav erscheint (bei einiger Herverhebung des Hinterhauptes erscheint er, wie bei anderen *Cardiocondyla*-Arten, stark ausgeschnitten). Der Vorderrand des Clypeus ist in der Mitte ziemlich ausgeschnitten. Die Stirnleisten sind S-förmig gebogen und divergieren stark nach hinten. Der Hinterrand des Clypeus ragt stark in Form eines länglichen Dreiecks zwischen die Stirnlappen hinein und ist daselbst seitlich deutlich abgegrenzt; das kleine Stirnfeld ist stark eingesenkt. Mandibeln mit 3 grösseren Zähnen und 2 winzigen dahinter. Der Scapus erreicht beinahe den Okzipitalrand; das 2. Funiculusglied etwas länger als das folgende; das Endglied so lang wie die 7 vorhergehenden zusammengenommen, etwa 3½ mal so lang wie das vorhergehende.

Der Thorax ist vorn 1½ mal breiter wie hinten, das Promesonotum oben etwas abgeflacht, mit deutlichen abgerundeten Seitenkanten und Schulterbeulen; die Mesoepinotumgrenze deutlich etwas eingesenkt und seitlich in eine Einschnürung übergehend; beiderseits der Basis der Epinotumdornen wieder eine Einschnürung. Die seitlichen Nähte wie bei *nuda*. Die Epinotumdornen dünn, spitz und lang, schief gestellt und auch bei Betrachtung von oben divergierend. Der Petiolusknoten in Profil oben bogenförmig abgerundet. Der Postpetiolus beinahe doppelt so breit wie der Petiolusknoten, queroval, vorn konkav.

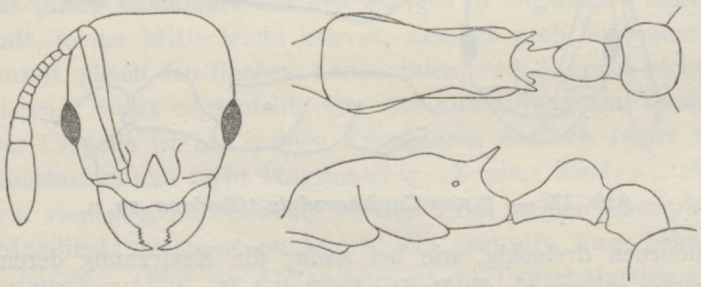


Abb. 14. — ♀ von *Cardiocondyla longispina*, sp. n.

Kopf punktiert-genetzt; auch der Thorax, dessen Oberseite gröber und deutlicher fingerhutförmig skulpturiert ist; auf dem Kopf ist diese Skulptur weniger deutlich. Die Stielchenglieder fein punktiert-genetzt, die Mandibeln sehr fein punktiert. Der ganze Körper halbmatt, mit Ausnahme der sehr glatten und glänzenden Gaster. Auf dem Kopf, der Oberseite des Thorax und des Postpetiolus in den Netzmaschen mit winzigen, kaum unterscheidbaren, Härchen; die Gaster mit spärlichen längeren anliegenden Härchen, solche Härchen auch auf den Hüften, den Beinen und Antennen, woselbst sie kürzer sind. Bräunlich; der Kopf und Thorax etwas rötlich, gelb; der Kopf und besonders die hintere

Hälfte der Gaster etwas bräunlicher. — Körperlänge (bei geneigtem Kopf) 1,5 mm bis kaum mehr.

Tjibodas, W. Java, W. Karawajew, Nr. 5377, 10 ☿.

Cardiocondyla nigrocerea sp. n. (Abb. 15).

☿. Kopf 1,33 mal so lang wie breit (0,51 mm lang, 0,39 mm breit), beinahe parallelseitig, hinten kaum breiter, mit schwach gewölbten Seiten, abgerundeten Hinterecken und kaum konkavem Okzipitalrand. Der mittlere Abschnitt des Clypeus ist sehr stark trapezförmig vorgestreckt, an den Ecken gerundet und in der Mitte deutlich konkav. Die Stirnleisten sind beinahe gerade, sehr schwach nach hinten divergent. Das Stirnfeld sehr eingesenkt; dessen Grenzen aber nicht unterscheidbar. Mandibeln mit 3 grösseren vorderen Zähnen und 2 winzigen dahinter. Die Augen sind oval, etwas schief gestellt; bei Betrachtung des Kopfes von vorn ist deren Längsdurchmesser dem Abstand vom hinteren Rand des Clypeus gleich, dagegen bei Betrachtung des Kopfes von der Seite erscheint er (wegen der schrägen Stellung der Augen) kürzer, etwa wie der Querdurchmesser. Der Scapus erreicht nicht den Okzipitalrand etwa um die Dicke an seinem Ende. Das 2. Funiculusglied ist kaum länger als das folgende; das Endglied so lang wie die 7 vorhergehenden zusammengenommen, 3½ mal so lang wie das vorletzte.

Der Thorax ist ganz vorn erweitert, weiter nach hinten etwa parallelseitig. Im Profil ist der Thoraxrücken vom 2. Drittel des Pronotums an beinahe ganz geradlinig, wobei in dieser Linie auch die Epinotumdornen liegen. Oben ist das Promesonotum ziemlich abgeflacht und am Pronotum erscheinen dadurch deutliche abgerundete Seitenkanten, welche sich in stark vorragende abgerundete Schulterbeulen verlängern; vorn ist das Pronotum stumpf stufenartig abfallend. Die seitlichen Nähte sind wie bei den vorher beschriebenen Arten; seitliche Einschnürungen sind nicht vorhanden; eine kurze schiefe Einsenkung befindet sich nur hinter der Metathorakaldrüse. Die Epinotumdornen sind lang, an der Basis breit, sich allmählich verjüngend und zugespitzt; bei Betrachtung von oben erscheinen sie etwa sichelförmig; zwischen der Basis der Epinotumdornen befindet sich eine dreieckige Einsenkung, welche auf der Abbildung durch eine Punktierlinie angedeutet ist; weiter nach hinten sind die Dornen auf der Abbildung durch eine bogenförmige Linie verbunden, welche dem Uebergang der Basalfläche des Epinotums in die abschüssige entspricht. Der Petiolus besitzt einen kurzen Vorderabschnitt und einen hohen

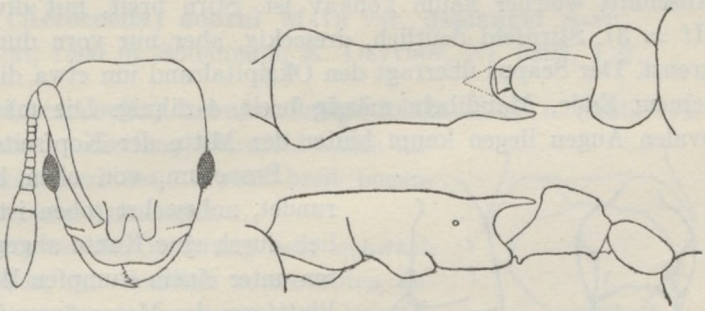


Abb. 15. — ☿ von *Cardiocondyla nigrocerea*, sp. n.

Knoten, welcher im Profil oben flach bogenförmig abgegrenzt ist; vorn unten befindet sich auf dem Petiolus ein kleiner zapfenförmiger Vorsprung. Der Postpetiolus ist im Profil flach, vorn oben mit einem abgerundeten Vorsprung; von oben betrachtet, erscheint er 1½ mal so breit wie lang, etwa nierenförmig, also vorn bogenförmig ausgeschnitten, hinten bogenförmig konvex, daselbst weniger breit.

Aeusserst fein punktiert, auf dem Kopf und Thoraxrücken etwas gröber, wobei aus dem Mittelpunkt der Grübchen unter dem Mikroskop kaum wahrnehmbare äusserst kurze Härchen entspringen; matt. Stielchenglieder und Beine sehr spärlich einfach, sehr fein, punktiert; ziemlich glänzend; auf den Beinen etwas längere spärliche anliegende Härchen. Gaster sehr glatt und glänzend; auf derselben sehr spärliche kurze anliegende Härchen. Hell gelblichwachsfarben, der Kaurand der Mandibeln dunkelbraun. Die Gaster tiefdunkelbraun, beinahe ganz schwarz. — Körperlänge des einzigen Exemplars (mit gestrecktem Kopf) 2 mm.

Amboina, W. KARAWAJEW, Nr. 2745, 1 ♀ unter der Rinde eines morschen liegenden Baumstamms.

Crematogaster (Acrocoelia) agniae sp. n. (Abb. 16).

♀. Kopf kaum breiter wie lang, hinten deutlich breiter, mit mässig gewölbten Seiten, stark abgerundeten Hinterecken und geradem Okzipitalrand. Der Vorderrand des Clypeus mit einem breiten kaum vortretenden mittleren Abschnitt welcher kaum konkav ist. Stirn breit, mit divergierenden Leisten (If = 3). Stirnfeld deutlich, dreieckig, aber nur vorn durch eine Naht abgegrenzt. Der Scapus überragt den Okzipitalrand um etwa die doppelte Dicke an seinem Ende. Mandibeln mässig breit, 4-zähnig. Die mässig gewölbten breit ovalen Augen liegen kaum hinter der Mitte der Kopfseiten.

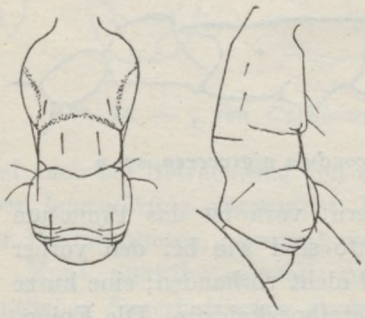


Abb. 16. — Stielchen des ♀ von *Crematogaster (Acrocoelia) agniae*, sp. n., von oben und von der Seite.

Pronotum, von oben betrachtet, vorn gerundet, unbewehrt; oben ist es abgeflacht, seitlich durch eine Kante abgegrenzt und geht hinten unter einem stumpfen Winkel in eine schiefe Plattform des Mesonotums über. Mesoepinotumnaht eingesenkt. Epinotum mit kaum hinaufgerichteten, divergenten, sehr dünnen und spitzen Dornen welche etwas kürzer sind als die Basalfläche des Epinotums. Petiolus im Profil dick zylindrisch, von oben betrachtet, etwa eiförmig; auf den vorderen ⅔ bildet er eine flache, kaum erhabene, Plattform welche seitlich und hinten bogenförmig-konkav abgegrenzt ist; die Grenze ist doch sehr abgerundet und wenig auffallend. Der Knoten des Postpetiolus ist im Profil oben gewölbt; bei Betrachtung von oben vorn und weniger hinten ausgebuchtet; ein Längseindruck, welcher den Knoten in zwei Hälften teilt, ist so schwach ausgeprägt dass er nur bei sehr

aufmerksamer Beobachtung, bei entsprechender seitlicher Beleuchtung, kaum unterscheidbar ist.

Mandibeln und Vorderabschnitt der Wangen oberflächlich längsgestreift, die Seiten des Mesothorax etwas unregelmässig gerunzelt, übrigens sehr glatt und glänzend. Mit spärlichen abstehenden Haaren, die anliegenden beinahe ganz fehlend; auf den Anhängen sind die Haare schief orientiert. Dunkelbraun, beinahe schwarz, die Anhänge etwas lichter, kaum gelblich. — L. beinahe 3 mm.

Lien Chieû bei Tourane, an der Basis von Col de Nuage, Zentralannam, K. Davydov, Nr. 5801, 1 ☿.

Crematogaster (Acrocoelia) ferrarii Em. (Pl. 2*b*).

Tjiampea bei Buitenzorg, 2. I. 1913, W. Karawajew, Nr. 2393, ☿☿, einige Königinnen und ♂♂ aus einem Nest, welches ich ebenfalls mitgebracht habe.

Die Bestimmung dieser Art verdanke ich meinem Freund Dr. C. Menozzi, Chiavari, dem ich dafür auch an dieser Stelle herzlich danke.

Die photographische Aufnahme dieses Nestes habe ich auf Pl. 2 bei *b* reproduziert. Es befand sich auf der Höhe von etwa 2 m in der Gabelung eines Bäumchens im Urwald von Tjiampea. Es ist 15 cm lang und hat ungefähr die Form eines Ovoids. Es besteht aus einer dunkelbraunen erdigen brüchigen Masse (beim Glühen verbrennt sie nicht), welche ein dichtes Labyrinth von schmalen Gängen (Durchmesser der zahlreichen Eingangsöffnungen 2-3 mm) besitzt und von feinen und gröberen Pflanzenwurzeln durchdrungen ist.

Crematogaster (Acrocoelia) dohrni Mayr var. **demangei** Sant.

Lang Biang, Dalat, 1500 m, Südannam, K. Davydov, Nr. 5803, 1 ☿.

Crematogaster (Acrocoelia) brunnea latipetiolata subsp. n. (Abb. 17).

☿. Kopf kaum breiter wie lang, Stirnfeld kaum unterscheidbar, der Vorderrand des Clypeus breit bogenförmig gewölbt, ganz ohne Ausschnitt.

Pronotum in transversaler Richtung sehr schwach gewölbt, beinahe gerade, mit deutlich vortretenden abgerundeten Seitenkanten, das Promesonotum in longitudinaler Richtung mässig bogenförmig gewölbt. Die Mesoepinotumnaht stark eingesenkt. Epinotumdornen kurz, dünn und spitz, kürzer als die quere Mesoepinotumnaht, beinahe wagerecht, stark divergent. Petiolus breiter wie lang, mit hervorragenden abgerundeten Seitenecken; da der Petiolus vorn quer abgestutzt ist, so bildet sich daselbst ein Paar stumpfer Ecken, welche stärker als die obenerwähnten abgerundet sind. Postpetiolusknoten mit einer stark ausgeprägten breiten Längsfurche, zu deren beiden Seiten sich je eine halbkreisförmige Wölbung befindet.

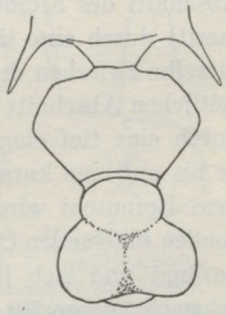


Abb. 17. — Epinotum und Stielchen des ☿ von *Crematogaster (Acrocoelia) brunnea latipetiolata*, subsp. nov.

Kopf sehr glatt und glänzend. Thorax oberflächlich, fein, undeutlich längsgestrichelt und ebenso punktiert, halbglänzend. Stielchenglieder und Gaster mi-

kroskopisch fein, undeutlich punktiert, glänzend. Anliegende Pubeszenz auf dem Körper kaum vorhanden, die hauptsächlich schief abstehende Behaarung sehr mässig. Farbe gelblichbraun. Meine Exemplare scheinen noch nicht ganz ausgefärbt zu sein. — L. 2,5 mm.

Caûda, Cochinchine, K. DAVYDOV, Nr. 5716, 3 ♀.

Crematogaster (Physocrema) aurita sp. n. (Abb. 18).

♀. Kopf 1,6 mal so breit wie lang, mit bogenförmig konvexen Seiten, vorn viel schmäler, mit schwach abgerundeten Hinterecken und flach bogenförmig konkavem Okzipitalrand. Clypeus mit sehr schwach hervorragendem trapezförmigen Lappen, dessen Breite die Hälfte des vorderen Durchmessers der Stirn beträgt; If der letzteren etwa 3,4. Stirnleisten etwas divergent, mit einem flach dreieckigen seitlichen Vorsprung an deren Basis; Stirnfeld in Form einer tiefen querdreieckigen Einsenkung. Der Scapus überreicht den Okzipitalrand um die 1½ Dicke an seiner Spitze. Mandibeln 5-zähnig. Augen flach oval, auf der Mitte der Kopfseiten gelegen.

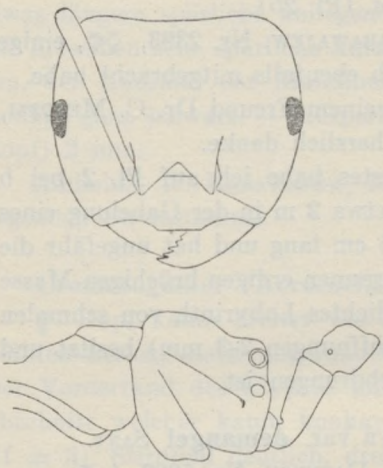


Abb. 18. — ♀ von *Crematogaster (Physocrema) aurita*, sp. n.

Eine Promesonotum-Naht ist nicht vorhanden, aber an Stelle derselben ist eine kaum unterscheidbare Einsenkung, an deren vorderen Ecke das Vorderende des Mesonotumschildes im Profil einen stumpfen Winkel bildet. Das letztere ist von dem seitlichen Abschnitt des Mesothorax (dem zusammengewachsenen Mesosternit + Mesepimerit) durch eine tiefe Einsenkung abgegrenzt welche sich auf dem Rücken in dieselbe zwischen dem Mesonotumschild und dem Epinotum fortsetzt. Von dem seitlichen Abschnitt des Pronotums wird der seitliche Abschnitt des Mesothorax durch eine tief eingesenkte Naht getrennt. Mit demselben des Metathorax ist er bis auf eine kurze unten vorhandene Naht ganz zusammengeschmolzen; von dem Epinotum wird er durch einen Kiel getrennt, welcher unter der grossen runden klaffenden Oeffnung der Metathorakaldrüse mit einer scharfen Erhebung anfängt und sich bis zum entsprechenden Stigma erstreckt, allmählich ganz schwach ausgeprägt werdend. Die Basalfläche des Epinotums ist an der mesoepinotalen Einsenkung stufen-buckelförmig hinaufgehoben und bildet dahinter im Profil eine bogenförmige Erhebung; von oben betrachtet, sieht man hier ein Paar flacher rundlicher Erhebungen, zwischen denen man eine sehr schwache Medianrinne unterscheidet. Oberhalb der kolossalen runden Epinotumstigmen erheben sich ein Paar ohrförmiger Vorsprünge, durch eine breite Einsenkung getrennt. Der Petiolus erscheint in Profilansicht lang zylindrisch, bei Betrachtung von oben länglich-oval. Der Postpetiolus ist so breit wie der Petiolus, im Profil oben buckelförmig, vorn stark eingeschnürt.

Kopf fein und scharf längsgestrichelt und dazwischen fein punktiert, matt; die Mandibeln etwas gröber längsgestrichelt. Thorax und Stielchenglieder sehr fein und oberflächlich längsgestrichelt und dazwischen mikroskopisch fein punktiert, matt. Gaster mikroskopisch fein netzartig punktiert, mit grösseren haartragenden Punkten, halbglänzend. Mässig dicht anliegend pubeszent, mit spärlichen abstehenden Haaren. Rötlich braun; Metathorax, Epinotum, Stielchenglieder, Basis der Gaster, Fühlergeissel und Tarsen gelblich. — L. 5-5,5 mm.

Pursat, Cambodge, Westufer des Grand Lac, 10. III. 1930, K. Davydov, Nr. 5778, 3 ☿.

Crematogaster (Paracrema) dubia sp. n. (Abb. 19).

☿. Diese Art passt nicht ganz gut zu der Diagnose der Untergattung *Paracrema*, denn auf der Oberseite des Postpetiolusknotens fehlt jegliche Spur einer Längsfurche, doch ist er vorn und hinten ausgeschnitten, wodurch eine paarige Beschaffenheit zustande kommt.

Kopf kaum breiter wie lang, vorn deutlich schmäler, mit ziemlich gewölbten Seiten, stark abgerundeten Hinterecken und geradem Okzipitalrand. Clypeus in beiden Richtungen gewölbt, sein Vorderrand in der Mitte deutlich bogenförmig ausgeschnitten. Die Stirnleisten gerade, etwas divergent (If beinahe 4). Der Scapus überragt den Okzipitalrand sehr wenig, die 4-gliedrige Clava 1½ mal so lang wie der übrige Teil des Funiculus. Mandibeln mässig breit, 4-zähnig. Die ziemlich grossen breit-ovalen Augen liegen etwa in der Mitte der Kopfseiten.

Pro- und Mesothorax nur seitlich durch eine Naht abgegrenzt. Pronotum mit dem Mesonotum vollständig zusammengeschmolzen; sie bilden eine flache birnförmige Plattform, welche seitlich durch eine scharfe dunkle Kante abgegrenzt ist; die vordere Hälfte des Mesonotums bildet einen Längskiel. Vor der Mesoepinotumnaht bildet die seitliche Mesonotumkante im Profil einen dreieckigen Vorsprung, wodurch die Naht etwas eingesenkt erscheint; seitlich befindet sich daselbst eine starke Einschnürung. Epinotum beinahe ebenso breit wie das Pronotum. Epinotumdornen stark zugespitzt, so lang wie die Basalfläche des Epinotums, beinahe wagerecht gestellt, sehr divergent. Petiolus in Profilansicht zylindrisch, bei Ansicht von oben birnförmig, oben abgeflacht. Postpetiolus im Profil buckelig, von oben betrachtet, in der Querrichtung breit bisquitförmig.

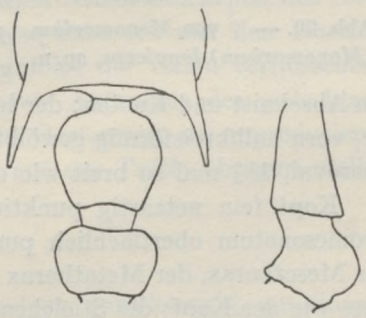


Abb. 19. — Epinotum und Stielchen des ☿ von *Crematogaster (Paracrema) dubia*, sp. n. (links) und das Stielchen von der Seite (rechts).

Kopf oben scharf, fein und weitläufig längsgerunzelt und dazwischen dicht netzartig punktiert. Mandibeln grob längsgerunzelt. Thorax unregelmässig netzartig punktiert, kaum längsgerunzelt. Stielchenglieder an den Seiten fein punk-

tiert, oben beinahe glatt. Der Körper ziemlich matt, der Kopf hinten halbglänzend. Gaster glatt und glänzend. Anliegende Pubeszenz mässig, abstehende Haare sehr spärlich. Gelblich rotbraun. — L. beinahe 3 mm.

Kampot, Cambodge, 25. II. 1930, K. DAVYDOV, Nr. 5685, 1 ♀. — Ream, ebenda, 19. II. 1930, Derselbe, Nr. 5802, 1 ♀.

Monomorium (Monomorium) longiceps sp. n. (Abb. 20).

♀. Kopf 1,2 mal so lang wie breit, parallelseitig, mit bogenförmig gewölbten Seiten, schwach bogenförmig gewölbtem Okzipitalrand und mässig abgerundeten Hinterecken. Clypeus mit sehr schwach angedeuteten Kielen; dessen Vorderrand ist vorgestreckt, in der Mitte sanft ausgerandet. Die Stirn (If = 4) mit ungefähr S-förmig gebogenen Leisten, ziemlich lang. Die Augen liegen etwas vor der Mitte der Kopfseiten. Der Scapus überreicht den Okzipitalrand um etwa die doppelte Dicke an seinem Ende. Die Clavaglieder werden gegen die Spitze des Funiculus allmählich länger und dicker; das Endglied ist kaum länger wie die zwei vorangehenden zusammengenommen; die Clava bedeutend länger als der Rest des Funiculus. Mandibeln mit 4 wohlausgebildeten Zähnen.

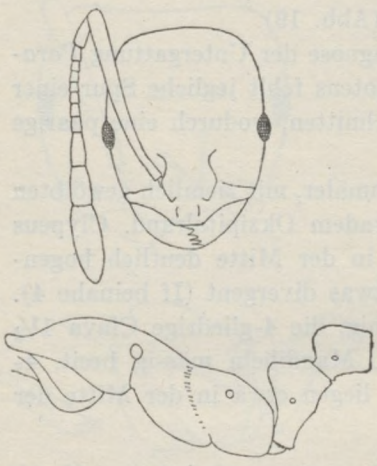


Abb. 20. — ♀ von *Monomorium (Monomorium) longiceps*, sp. n.

Promesonotumprofil gleichmässig aber nicht stark bogenförmig gewölbt; Mesoepinotumeindruck schwach, Basalfläche des Epinotums etwas gewölbt. Petiolus mit wohlausgebildetem vorderen Abschnitt und Knoten; der letztere bei Betrachtung von oben hinten schmäler, vorn halbkreisförmig gewölbt. Postpetiolusknoten bei Betrachtung von oben queroval, 1½ mal so breit wie der Petiolusknoten.

Kopf fein netzartig punktiert, durchaus matt; Mandibeln längsgestreift. Promesonotum oberflächlich punktiert, weniger matt; der seitliche Abschnitt des Mesothorax, der Metathorax und das Epinotum beinahe ebenso scharf punktiert wie der Kopf; die Stielchenglieder wieder feiner und oberflächlicher punktiert. Gaster ganz glatt und glänzend. Gelblich braun; der Kopf, das Epinotum und die Gaster dunkler. Anliegende Pubeszenz nur an den Anhängen; abstehende Haare äusserst spärlich. — L. 2,3 mm.

Steht sehr nahe zu *M. longi* FOR. aus Assam.

Lang Biang, Dalat, 1500 m, Südannam, 26. I. 1931, K. DAVYDOV, 2 ♀. — Ebenda, Derselbe, Nr. 5796, 1 ♀.

Solenopsis geminata rufa (JERD.).

Dobo, Ins. Wammar des Aroe Archipels, 9. III. 1913, W. KARAWAJEW, Nr. 2571, zahlreiche grosse und kleine ♀♀. Kolonie in morschem Holz und in dem Boden darunter. — Ebenda, Derselbe, Nr. 2533. Im Zimmer auf dem Tisch auf

einem Stück Fleisch gesammelt. — Ebenda, Derselbe, Nr. 2525; grosse und kleine ☿☿, geflug. ♀♀ und ♂♂. Eine Kolonie unter der Basis eines morschen Blattstiels einer Kokospalme in der Nähe des sandigen Bodens, in welchen sich das Nest fortsetzte. — Ebenda, Derselbe, Nr. 2670; grosse und kleine ☿☿ und geflüg. ♀♀. Gegen Abenddämmerung auf einem morschen Holzklotz eines Grabes gesammelt. Die ♀♀ waren massenhaft vorhanden, sich wahrscheinlich zu einem Hochzeitsflug vorbereitend. Von ♂♂ sah ich keins. — Banda Neira, Derselbe, Nr. 2517, ☿☿. — Ambon, Derselbe, Nr. 2464, ☿☿ und 1 geflüg. ♀. — Ebenda, Derselbe, Nr. 2471, ☿☿. Nest auf einem Fusssteg, zwischen Alang-alang-Gras. — Singapore, O. John, Nr. 5404, ☿☿. In Nüssen in einer Reisetasche, welche 5 Tage liegen gelassen wurde.

Verbreitung: Indische und Malayische Region, Ozeanien. Mann hat diese Ameise auf den Salomoinseln nicht gefunden.

Pheidologeton affinis (Jerd.) (Pl. 2*a*).

Buitenzorg, Java, W. Karawajew, ☤☤ und ☿☿.

Dass *P. affinis* gedeckte Gänge aus Erde macht, ist schon längst bekannt, dieselben wurden aber, gleich dem schornsteinförmigen Eingang in das unterirdische Nest, noch nicht abgebildet.

Auf Pl. 2 gebe ich bei *a* eine Wiedergabe einer von meinen photographischen Aufnahmen, die ich im Jahre 1913 im Botanischen Garten in Buitenzorg von den Erdbauten von *P. affinis* gemacht habe. Die genannte Aufnahme stellt den schornsteinförmigen Eingang in das Nest dar, welcher sich auf einem Gartenweg befand und aus locker aufeinandergehäuften feinen Stückchen des rotbraunen Lateritbodens bestand; bedauerlicherweise habe ich mir den Durchmesser des Baues nicht notiert und kann mich infolge der vielen verflossenen Jahren darüber nicht erinnern. Ich habe noch eine Aufnahme des gedeckten Gange dieser Ameise durch einen nebenliegenden Gartenweg, ich reproduziere aber diese Aufnahme nicht wegen Raummangel auf der Tafel; übrigens stellt sie aber auch nichts besonderes dar.

Pheidologeton rugosus sp. n.

☤. Kopf bei dem grössten ☤ kaum breiter wie lang, parallelseitig, mit einem deutlich tieferen Ausschnitt am Vorderrand des Clypeus als bei *diversus* und *affinis*. Die Okzipitaleinsenkung ist tiefer als bei *diversus*, etwa wie bei *affinis;* die Rinne, welche sich davon nach vorn zieht, ist recht eingesenkt. Bei den kleineren ☤ ist der Kopf deutlich länger und die Okzipitalecken sind spitzer. Bei einem von meinen 16 ☤ ist eine wohl ausgebildete Ocelle vorhanden, bei einem anderen ist sie rudimentär, bei den übrigen fehlt sie gänzlich. Der Scapus ist etwas länger als der halbe Abstand von seiner Basis bis zur Spitze der Hinterecke.

Das Promesonotum ist kugelig aufgetrieben, deutlich dicker als der übrige, etwa parallelseitige, Abschnitt des Thorax. Mit kleinen spitzen Pronotumbeulen und ziemlich aufrechten, spitzen, dreieckigen, schwach divergenten, Epinotum-

dornen; die letzteren sind viel kürzer als bei *diversus* und etwas länger als bei *affinis*. Der hinterste Abschnitt des Mesonotums ist, wie bei anderen Arten, stark in Form eines Querwulstes hinaufgeworfen, von dem sich nach vorn zwei divergierende Leisten ziehen; dicht hinter diesem Wulst liegt ein kleiner Querwulst, welchen das Metanotum bildet.

Der Kopf ist äusserst scharf gerunzelt, dazwischen fein punktiert und dadurch matt; bis etwas hinterhalb der vorderen Ocelle ist der Kopf längsgerunzelt, wobei von da an die Runzeln fächerartig nach aussen umbiegen; die Okzipitalgegend ist noch schärfer und weitläufiger, etwas wellenartig, quergerunzelt. Der mittlere Abschnitt des Clypeus ist beinahe ganz glatt und glänzend, auch das eingesenkte, dreieckige Stirnfeld. Die Mandibeln sind gegen die Basis und die beiden Längsrander fein längsgestrichelt, übrigens ziemlich glatt und glänzend und weitläufig punktiert. Der Thorax um die Epinotumstigmen herum und übrigens etwas quer dicht punktiert, matt; die Stielchenglieder noch feiner quergerunzelt und punktiert, ebenfalls matt. Gaster mikroskopisch fein dicht punktiert, doch etwas glänzend. Anliegende Pubeszenz und abstehende Behaarung mässig; die abstehenden Haare teilweise abgestutzt. — L. bis 9 mm.

☿. Der Kopf ist deutlich länger wie breit, bei den kleinsten der bei mir vorhandenen ☿ ist er in der Mitte am breitesten, bei den etwas grösseren dagegen hinten breiter. Der Okzipitalrand ziemlich tief eingebuchtet und die Hinterecken spitzer als beim ☿. Der vordere Clypeusrand kaum ausgebuchtet. Der Scapus überreicht kaum den Okzipitalrand. Mandibeln schmal, dreieckig, zugespitzt, mit 6 Zähnen, von denen die 2 äusseren sehr lang und spitz sind.

Das Pronotum ist beinahe doppelt so breit wie der angrenzende Teil des Mesothorax; mit dem vordersten Teil des Mesonotums bildet das Pronotum eine dreieckige Plattform, deren Seitenkanten etwas abgerundet, doch deutlich erkennbar sind. Mit ziemlich langen spitzen dreieckigen Pronotumdornen, welche schief nach vorn gerichtet sind. Das Rückenprofil entsprechend der Mesoepinotumnaht stumpfwinkelig eingesenkt. Epinotumdornen etwas kleiner als die Pronotumdornen, aufrecht, divergent, mit feinen, etwas nach vorn gekrümmten, Spitzen. Petiolus mit langem Vorderabschnitt und hinaufragendem abgerundeten Knoten, in der Querrichtung komprimiert; Postpetiolus ⅔ so hoch wie der Petiolus, von oben betrachtet, oval.

Kopf, Pronotum und Petiolus fein punktiert, matt. Der Clypeus und die Stirn ziemlich glatt und etwas glänzend, die Mandibeln fein längsgestrichelt, matt. Der Mesothorax und das Epinotum viel gröber fingerhutartig punktiert. Postpetiolus oben schwächer punktiert, Gaster mikroskopisch fein punktiert, halbglänzend. Anliegende Pubeszenz sehr spärlich, abstehende Behaarung ebenfalls spärlich, aber dadurch auffallend, weil die Haare sehr lang sind. Gelbbräunlich, der Kopf etwas dunkler. L. 2,2-2,3 mm.

Tjibodas, W. Java, W. KARAWAJEW, Nr. 2755, zahlreiche ☿☿ und ☿☿.

Oligomyrmex (Oligomyrmex) satanus sp. n. (Abb. 21).

☿. Kopf (ohne Hörner) 1,13 mal so lang wie hinten breit (bis zum Grund des Okzipitalausschnittes 1,2 mm lang, mit den Hörnern 1,36 mm, hinten 1,03

mm breit), beinahe parallelseitig, hinten kaum breiter. Die Okzipitalhörner verjüngen sich ganz allmählich gegen die Spitze, woselbst sie abgerundet sind. Der Vorderrand des Clypeus ist kaum konvex; seitlich, gegen die Mitte der Mandibeln, mit einer kleinen Stufe. Die stark divergierenden Stirnleisten bestehen eigentlich nur aus dünnen durchsichtigen lamellenartigen Lappen, unter welchen der Scapus artikuliert. Das Stirnfeld ist länglich, stark eingesenkt, vorn undeutlich abgegrenzt; von der Hinterspitze desselben zieht sich bis zum Okzipitalrand eine feine Stirnrinne. Der Hinterrand des Clypeus kennzeichnet sich durch eine dunkelbraune Linie, welche sich etwas bogenförmig gegen die Stirnleisten zieht. Der Scapus überreicht etwas den Hinterrand des Auges, welches auch bei Frontalansicht etwas sichtbar ist; der Scapus ist an der Basis sehr dünn und verdickt sich ganz allmählich gegen die Spitze; das Endglied des Funiculus ist, wie bei den anderen Arten, etwas mehr als doppelt so lang wie das vorhergehende. Bei seitlicher Ansicht erscheinen die Okzipitalhörner etwas nach vorn gebogen. Die kleinen ovalen Augen liegen etwas vor der Mitte der Kopflänge. Die Mandibeln sind massiv, gewölbt, 6-zähnig.

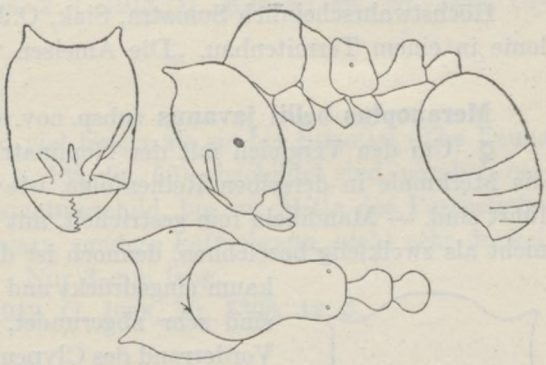


Abb. 21. — ♀ von *Oligomyrmex (Oligomyrmex) satanus*, sp. n.

Der Thorax erscheint bei Ansicht von oben geigenförmig, also bisquitförmig eingeschnürt, mit kreisförmigem vorderen Abschnitt, welcher ⅔ so breit ist wie der Kopf. Bei Ansicht von der Seite ist das Pronotum ebenfalls abgerundet. Die Basalfläche des Epinotums ist an der Naht mit dem Mesonotum stufenförmig hinaufragend und dann etwas geneigt; mit der abschüssigen Fläche bildet sie einen stumpfen Winkel, welcher jederseits eine Epinotumbeule bildet; die abschüssige Fläche bildet eine breite, von geraden Ebenen gebildete, Längsrinne, welche von der Spitze der Epinotumbeule an je eine nach vorn und unten verlaufende Kante bildet. Der Petiolus ist in Profilansicht mit hohem oben abgerundeten Knoten, vorn gestielt, der Postpetiolus viel niedriger; bei Ansicht von oben erscheint der Petiolus birnförmig, hinten beinahe kreisförmig aufgeblasen, mit konischem, sich stark verjüngenden, Stiel. Der Postpetiolus erscheint bei Ansicht von oben beinahe ganz abgerundet, vorn kaum kurz verjungt; er ist ebenso breit wie der Petiolusknoten.

Kopf in verworrenen Reihen mikroskopisch fein punktiert und ausserdem mit zerstreuten grösseren Punkten, welchen sehr kurze anliegende Härchen entspringen, halbglänzend. Die seitlichen Abschnitte des Clypeus und die vordersten Abschnitte der Wangen längsgestrichelt; der mittlere Abschnitt des Clypeus ziemlich glatt und glänzend. Mandibeln mikroskopisch fein punktiert, undeutlich längsgestrichelt, mit undeutlichen grösseren Punkten, ziemlich glänzend. Pronotum und Mesonotum sehr glatt und glänzend, mit zerstreuten Punkten, welchen

sehr kurze anliegende Härchen entspringen; der übrige Teil des Thorax, die Stielchenglieder und die Gaster undeutlich mikroskopisch fein punktiert, halbglänzend; die Gaster mehr glänzend, auf der letzteren noch zerstreute undeutliche grössere Punkte, mässig entwickelte längere anliegende Haare und auf dem Rand der Segmente schief abstehende lange gelbliche Haare. Gelblich rostfarben, der Kopf dunkler, rötlich.

Höchstwahrscheinlich Sumatra, Siak, O. JOHN, Nr. 5406, zahlreiche ♀♀. Kolonie in einem Termitenbau. „Die Ameisen waren sehr träge".

Meranoplus bellii javanus subsp. nov. (Abb. 22).

♀. Um den Vergleich mit der Nominatrasse zu erleichtern, beschreibe ich die Merkmale in derselben Reihenfolge, wie sie von FOREL für dieselbe angeführt sind. — Mandibeln fein gestrichelt, mit 5 Zähnen. Den Clypeus kann man nicht als zweikielig bezeichnen, dennoch ist der mittlere Abschnitt in der Mitte kaum eingedrückt und die zwei Hälften beiderseits davon sind sehr abgerundet, ohne eine Spur eines Kiels; der Vorderrand des Clypeus ist geradlinig. Der Kopf ist kaum breiter wie lang (bei meinem einzigen Exemplar 1,1 mm lang, 1,17 mm breit), nicht rechteckig, sondern vorn deutlich schmäler (der Abstand zwischen den Vorderecken der Stirnleisten 0,57 mm), mit einem sehr schwach bogenförmig gewölbten Okzipitalrand, kaum gewölbten Seiten und sehr mässig gerundeten Hinterecken. Die schwach gewölbten Stirnleisten sind stark divergent und erstrecken sich beinahe bis zu den Hinterecken, woselbst sie, die Antennenfurche begrenzend, sich in einer Schleife nach aussen und unten umbiegen. Das sichelförmige breite Stirnfeld ist nur dadurch unterscheidbar dass es ganz glatt und glänzend ist. Der Scapus erreicht, in die Antennenfurche eingelegt, beinahe die Hinterecke des Kopfes.

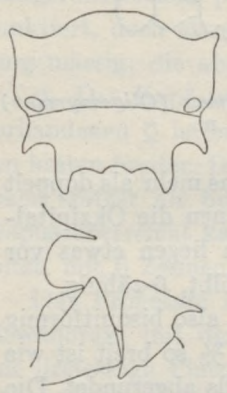


Abb. 22. — Thorax (oben), Epinotumende und Stielchen (unten) des ♀ von *Meranoplus bellii javanus*, subsp.n.

Das Promesonotumschild ist auf der beiliegenden Abb. dargestellt Die Promesonotumnaht ist vorhanden, aber nur bei einer sehr aufmerksamen Untersuchung unterscheidbar; dicht an den Hinterecken des Pronotums liegt je ein tiefes ovales Grübchen. Von den zwei flachen Dornen des Hinterrandes des Mesonotums, welche von ihrer Basis an etwas hinaufgerichtet sind, ist das zweite bedeutend grösser; am Hinterrand zwischen den letztgenannten Dornen befindet sich noch ein Paar ganz winziger flacher Zähnchen, worüber FOREL nichts berichtet. Die Basalfläche des Epinotums liegt mit der abschüssigen in einer gemeinsamen Ebene und beide sind von einander im Gegensatz zum Typus gar nicht abgesondert. Die Epinotumdornen sind dünn, spitz und lang, ziemlich hinaufgerichtet und dabei etwas divergent; seitlich ist die basale und abschüssige Fläche durch eine Runzelkante abgesondert. Petiolus, wie beim Typus, keilförmig, oben scharfrandig, kaum konkav. Der Postpetiolus unten vorn mit einem langen Zapfen, den man aber nicht als „arête transversale", wie beim Typus

(Forel) bezeichnen kann; der obere, nach hinten gerichtete, Zahn unterscheidet sich scheinbar nicht vom Typus. Gaster herzförmig. Gelblichbraun, kaum rötlich, nicht dunkel, Gaster mehr gelblich. Abstehende Behaarung dicht, mässig lang, an der Spitze gebogen; auf dem Kopf befinden sich ausser diesen Haaren noch spärlich zerstreute viel längere. — Körperlänge meines einzigen Exemplars (mit geneigtem Kopf) 4 mm.

Tjiampea bei Buitenzorg, Java, 2. I. 1913, W. Karawajew, Nr. 2360, Urwald, 1 ☿.

Meranoplus bicolor Guér.

☿. Die Mesonotumdornen sind viel länger als sie bei Bingham (The Fauna of Brit. India, 1903, Hym. vol. II, p. 168, fig. 66) abgebildet sind, nämlich beinahe ebenso lang wie das Promesonotumschild, bis zur Mitte des Postpetiolus reichend. Die Gaster ist nicht schwarz, sondern kaffeebraun, nicht sehr dunkel, mit einem olivengrünen Anflug. — Nur 3 mm lang.

Rambodda, Ceylon, 8. XII. 1912, O. John, Nr. 5306, 12 ☿.

Meranoplus mucronatus Sm.

Kuala Lumpur, Selangor, Malakka, 16. I. 1913, O. John, Nr. 5305, zahlreiche ☿☿. — Kota Baroe, Sumatra, Derselbe, Nr. 5405, zahlreiche ☿☿. Deutlich heller als die von Kuala Lumpur.

Pristomyrmex quadridens Sm. var. **aruensis** nova.

☿. Emery (Termész. Füzetek, 20, 1897, p. 584) sagt: „laminis frontalibus usque ad oculos productis", indessen bei meinem Exemplar ragen die Stirnleisten weit hinter die Augen hinaus. Die Farbe ist dunkel rotbraun, die Gaster noch dunkler.

Wammar, Aroe Archipel, W. Karawajew, Nr. 2671, 1 ☿.

Podomyrma basalis reyi subsp. nova.

☿. Mayr (Tijdschr. Ent., 10, 1867, p. 108) führt *basalis* für „Mysol, Doree, Aru, Amboina und Buru" an, indessen es ist unbekannt — Exemplaren welcher von diesen Inseln seine Beschreibung entsprechen soll. Oder fand er keinen Unterschied unter den Vertretern dieser verschiedenen Inseln? Meine Exemplare von Amboina unterscheiden sich von seiner Beschreibung erheblich und ich finde es angemessen für dieselben vorläufig wenigstenz eine neue Rasse zu schaffen.

Der Kopf ist kaum länger wie breit (bei dem grössten meiner ☿ 1,49 mm lang, 1,42 mm breit), vorn deutlich schmäler, mit beinahe ganz geradem Kopfseiten, schwach konkavem Okzipitalrand und sehr mässig abgerundeten Hinterecken. Der Clypeus ist in der Querrichtung ganz flach, der mittlere Abschnitt vorn flach bogenförmig begrenzt. Mandibeln 6-zähnig. Der Scapus erreicht nicht den Okzipitalrand um beinahe das ¼ seiner Länge oder die doppelte Dicke an seinem Ende. Das Stirnfeld ist sichelförmig.

Die Pronotumdornen sind gut entwickelt, dreieckig, ziemlich spitz, so hoch wie an der Basis breit. Dieselben sind in der Querrichtung durch eine bogenförmige scharfe Runzelkante verbunden. Die Mesonotumzähne fehlen. Die Mesoepinotum-Einsenkung ist weniger tief als bei *tristis*. Das Epinotumprofil stumpfwinkelig, mit abgerundetem Uebergang der Basalfläche in die abschüssige. Der Petiolus ist etwa doppelt so lang wie breit, vorn, von oben betrachtet, mit zwei winzigen Ecken, an welchen hinten die Stigmen liegen, im allgemeinen vorn kaum breiter als hinten. Im Profil sieht man oben an der Grenze des 1. und 2. Drittels einen spitzen Zahn und unten, ganz vorn, einen flachen langen Zapfen; vorn, in der Gegend des oberen Zahnes, ist der Petiolus höher. Der Postpetiolus ist hinten in der Querrichtung verdickt.

Die Längsstreifung des Kopfes und Thorax ist sehr regelmässig und scharf. Auf der Stirn befinden sich, die Stirnleisten einbegriffen, 10-11 Streifen. Ausserhalb der Stirn verlaufen die Streifen zickzackartig und zwischen denselben befindet sich eine feine Punktierung. Auf dem mittleren Abschnitt des Clypeus sind die Streifen spärlicher; das Stirnfeld ist bei den einen Exemplaren mit Längsstreifen und matt, bei den anderen glatt und glänzend. Mandibeln sehr fein längsgestreift. Das Epinotum ist ebenfalls längsgestreift, auf der abschüssigen Fläche ziemlich glänzend. Der Petiolus ist oben und an den Seiten schwach längsgestreift und dazwischen mikroskopisch fein punktiert, halbglänzend; der Postpetiolus kaum längsgestreift, mikroskopisch fein punktiert, halbmatt. Die Gaster ist glatt und glänzend, nur ganz vorn seidenartig mikroskopisch fein längsgestrichelt. Die Beine glatt und glänzend. Kopf, Thorax und Stielchenglieder gelbrötlich, die Beine etwas mehr gelblich, die Gaster wachsgelblich. Die distale Hälfte der spindelförmig angeschwollenen Schenkel und manchmal die Spitze der Schienen rötlich dunkelbraun; von derselben Farbe das hintere ⅓ des 1. Gastersegmentes und die übrigen Segmente; der dunkle Abschnitt des 1. Gastersegmentes ist nach vorn winkelig erweitert und von der Spitze dieses Winkels kann er sich nach vorn noch mehr verlängern; an den Seitenrändern des 1. oberen Halbringes verbreitet sich die dunkle Farbe sichelförmig beinahe bis zur Basis des Segmentes; der untere 1. Halbring ist gelblich. Anliegende Pubeszenz beinahe ganz fehlend, die abstehenden Haare kurz, abgestutzt, auf dem ganzen Körper sehr spärlich verteilt, auf dem 1. oberen Halbring der Gaster ganz fehlend.

L. (bei geneigtem Kopf) 4,5-5,5 mm.

Ambon, 18. II. 1913, W. KARAWAJEW, Nr. 2490, 6 ♀, im Garten des Hernn REY auf Palmen gesammelt. — Tifoe auf der Insel Boeroe Derselbe, Nr. 2438, zahlreiche ♀♀.

Podomyrma laevifrons SM.

Wenn man meine Exemplare nach der Tabelle von VIEHMEYER (Deutsche Ent. Zeitschr., 1914, p. 521) bestimmt, so gelangt man zu Nr. 2, welcher *gibbula* VIEHM. und *laeviceps* MAYR entsprechen, meine Exemplare passen aber weder zu der einen noch zu der anderen dieser zwei Arten, mehr aber doch zu der

letzteren. Die aruanische Art *laevifrons* Sm., welche in die Tabelle von Viehmeyer nicht eingenommen ist, steht sehr nahe zu *laeviceps*, denn nach Poulton (Viehmeyer, l.c., p. 520) passt die Beschreibung Mayr's von *laeviceps* sehr gut auch auf die Type von *laevifrons*. Viehmeyer bemerkt ganz richtig dass sowohl *laevifrons* als auch *laeviceps* zu sehr ungenügend charakterisierten Arten gehören, deren definitive Klarstellung erst nach dem Vergleich der beiden Typen zu erreichen sein wird. Da aber meine Exemplare, gleich dem Typus von *laevifrons*, von Aroe stammen, so ist es höchst wahrscheinlich dass sie eben dieser Art angehören. Ich gebe im folgenden eine ausführliche Beschreibung derselben.

☿. Sehr dimorph, mit allmählichen Uebergängen zwischen den beiden Extremen. Kopf bei den grösseren ☿ etwa 1,15 mal so lang wie breit, vorn kaum schmäler, mit geradem Okzipitalrand und mässig abgerundeten Hinterecken. Die Augen liegen kaum hinter der Mitte der Kopfseiten. Die Stirnleisten kaum divergent, sich hinter das Auge erstreckend und dann in die Längsrunzelung des Kopfes übergehend, welche in der Okzipitalgegend fächerartig auseinander geht. Stirnfeld dreieckig, eingesenkt, spiegelglatt und glänzend. Mandibeln 6-zähnig. Der Scapus erstreckt sich etwas mehr als bis zur Mitte des Abstandes vom Hinterrand des Auges bis zum Okzipitalrand.

Pronotum mit wohlausgebildeten ziemlich spitzen Zähnen. Das Mesonotum seitlich durch eine tiefe eingesenkte Naht abgegrenzt, welche nach vorn etwas konvergent verläuft; weiter nach vorn wird es durch eine feine, schwach, aber deutlich eingesenkte, Furche abgegrenzt, welche ein Dreieck bildet. Die Mesonotumdornen sind klein, spitz, dreieckig. Die Basalfläche des Epinotums ist in longitudinaler Richtung bogenförmig begrenzt; die Epinotumbewaffnung besteht aus winzigen zugespitzten Erhebungen, welche nur bei einigen Exemplaren vorhanden sind, meistens aber ist der Uebergang der Basalfläche in die abschüssige einfach abgerundet. Petiolus dreimal so lang wie breit; der Knoten in Form einer schwachen Erhebung; der Postpetiolus gleich lang wie breit, beinahe 1½ mal breiter wie der Petiolus, deutlich höher als der letztere.

Der Kopf ist mässig grob längsgestreift, wobei die Streifen sehr stark abgerundet sind, Mandibeln etwas schärfer und dichter längsgestreift. Der Thorax bedeutend grober längsgestreift, wobei die Streifen mehr erhaben und scharf sind. Die Stielchenglieder sind mit spärlichen schwachen rippigen Längsstreifen. Gaster glatt und glänzend; ganz dicht an der Artikulation mit dem Postpetiolus eine feine dichte Längsstreifung. Man muss die ganze Oberfläche des Körpers und der Anhänge im allgemeinen als glänzend bezeichnen. Die anliegende Pubeszenz auf dem ersten Gasterring lang, mässig dicht, übrigens beinahe abwesend; die abstehenden langen Haare eher als spärlich zu bezeichnen, auf dem Promesonotum besonders lang und senkrecht gestellt. Gelblich rostfarben, die Gaster dunkler. — L. 3,5-7 mm.

Wammar, Aroe Archipel, 10. III. 1913, W. Karawajew, Nr. 2579, zahlreiche ☿☿. Urwald. Auf der Oberfläche von Stämmen kurz vordem gefällter Bäume einzeln gesammelt. Zeichnen sich durch äusserst träge Bewegungen aus,

sogar wenn sie gestört werden. — Ebenda, 28. III. 1913, derselbe, Nr. 2695, ☿☿. Liefen in grosser Anzahl auf der Oberfläche eines auf dem Boden liegenden *Hydnophytum*-Knollens herum, welcher von einer Kolonie von *Paratrechina obscura* besiedelt war. Einige ☿ wurden auch im Innern des Knollens gefunden, ausserhalb des von *Paratrechina* besiedelten Teils.

Podomyrma tristis sp. n.

☿. Ich besitze nur grosse und mittelgrosse Exemplare. Der Kopf ist etwa 1,1 mal so lang wie breit, vorn deutlich schmäler, mit mässig gewölbten Seiten, kaum gewölbtem Okzipitalrand und sehr mässig abgerundeten Hinterecken. Die Stirnleisten divergieren mässig und erreichen beinahe den Okzipitalrand. Das etwa sichelförmige Stirnfeld ist kaum eingesenkt. Die Augen liegen etwa in der Kopfseiten. Der Scapus erstreckt sich etwas mehr als bis zur Mitte des Abstandes vom Hinterrand des Auges bis zum Okzipitalrand.

Das Promesonotum ist in der Längsrichtung stark bogenförmig gewölbt. Die Pronotumdornen sind recht ausgebildet, dreieckig. Das Mesonotum ist vollständig mit dem Pronotum verschmolzen, seitlich dagegen durch parallele scharf ausgeprägte und eingesenkte Nähte abgesondert. Der Rest der Mesonotumdornen bleibt als eine kaum unterscheidbare Andeutung an der Knickung der Promesonotum-Naht. Das Epinotum ist sowohl in der Längs- als auch in der Querrichtung stark abgerundet. Der Petiolus ist kaum mehr als doppelt so lang wie breit, doppelt so lang wie hoch, unten vorn mit einem flachen Fortsatz; mit einem deutlich abgesonderten Knoten, welcher vorn eine Ecke bildet. Postpetiolus mit einem abgesonderten queren Knoten, welcher die Form eines breiten Ovals besitzt und etwas mehr als 1½ mal so breit ist wie der Petiolusknoten.

Kopf zwischen den Stirnleisten fein, unregelmässig und sehr oberflächlich, längsgestreift und dazwischen mikroskopisch feinst punktiert. Ausserhalb der Stirn ist der Kopf ungestreift, nur mikroskopisch fein punktiert, mit spärlich zerstreuten, kaum wahrnehmbaren, etwas weniger feinen Pünktchen. Der mittlere Abschnitt des Clypeus mit drei feinsten erhabenen Längsstreifen; die Seiten dicht längsgestreift. Mandibeln fein längsgestreift und dazwischen fein punktiert. Der Kopf halbglänzend. Thorax, Stielchenglieder und Gaster glatt und glänzend, aber die ersten zwei Körperabschnitte an den Seiten stellenweise sehr fein punktiert; auf dem Pronotum sehr spärlich zerstreute gröbere Punkte. Anliegende Pubeszenz sehr kurz und spärlich, fast ausschliesslich auf den Schenkeln, Schienen und der Gaster. Spärlich abstehende Haare auf dem Clypeus, den Mandibeln, der Spitze und Unterseite der Gaster. Gleichmässig sehr dunkel kastanienbraun, beinahe schwarz, nur die Mandibeln und Tarsen etwas weniger dunkel, rötlich. — L. 5-6,5 mm.

Wammar, Aroe Archipel, 10. III. 1913, W. KARAWAJEW, Nr. 2581, ☿☿. Urwald. Auf den Stämmen kurz vordem gefällter Bäume gesammelt. Zeichnen sich gleich *laevifrons* SM. durch äusserst träge Bewegungen aus, sogar wenn sie beunruhigt werden.

Solenomyrma gen. nov.

☿. Antennen 11-gliedrig mit 3-gliedriger Clava. Maxillentaster 4-gliedrig, Lippentaster 3-gliedrig. Der Clypeus ragt stark zwischen die Stirnlappen hinaus, sein Hinterrand bildet vor der Artikulation der Antenne keinen Scrobus. Mandibeln breit, massiv, vorn deutlich gezähnt. Prothorax vom Mesothorax nur bis auf eine seitliche Naht getrennt, welche sich bis zum entsprechenden Stigma erstreckt. Mesothorax vom Metathorax und Epinotum durch eine deutliche scharfe Einschnürung getrennt. Epinotum bewehrt. Petiolus stachelig. Schenkel sämtlicher Beine stark spindelartig verdickt. Sowohl die mittleren als auch die hinteren Tibien ganz sporenlos.

Scheint einer neuen Tribe anzugehören.

Solenomyrma acanthina sp. n. (Abb. 23).

☿. Kopf 1,1 mal so lang wie breit, hinter den Augen parallelseitig, vorn schmäler, mit abgerundeten Hinterecken und kaum konkavem Okzipitalrand; in transversaler Richtung ist der Kopf abgeflacht. Der Vorderrand des Clypeus ist in der Mitte seicht ausgebuchtet. Stirn kurz und breit, die Leisten gerade, nach hinten kaum divergent, die Lappen dreieckig, vorn abgestutzt; hinter der Antennenartikulation befindet sich unter der Stirnleiste eine flache tiefe Ausbuchtung. Stirnfeld klein, dreieckig, eingesenkt. Der Scapus reicht etwa bis zu ⅔ der Kopflänge. Clava deutlich länger als der Rest des Funiculus, aus 3 Gliedern bestehend, welche gegen die Spitze länger werden; das Endglied deutlich länger als die 2 vorhergehenden zusammengenommen. Mandibeln sehr massiv, mit breitem Zahnrand, mit 3 Zähnen welche in der Richtung nach hinten allmählich kleiner werden; dahinter ist der Zahnrand undeutlich gezähnelt. Augen gut entwickelt, eiförmig, vor der Mitte der Kopfseiten gelegen.

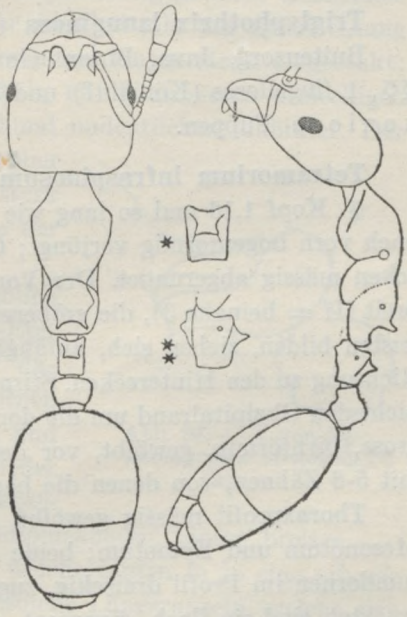


Abb. 23. — ☿ von *Solenomyrma acanthina*, gen. et sp. n. * *Petiolus* von oben, ** derselbe von der Seite.

Pronotum mit schwach ausgeprägten seitlichen beulenartigen Ecken. Die grossen runden Mesonotum-Stigmen sind bei Betrachtung von oben teilweise sichtbar. Die Basalfläche des Epinotums besitzt ein Paar seitlicher eckiger Vorsprünge; die Epinotumbewaffnung besteht aus einem Paar in longitudinaler Richtung abgeflachter Vorsprünge welche stark nach oben gerichtet sind, die abschüssige Fläche stark ausgebuchtet. Der Petiolus ist sehr eigenartig gebaut. Unten befindet sich bei ihm eine dünne mediane Lamelle mit einem kleinen vorderen und einem grösseren hinteren Vorsprung; oben besitzt der Knoten des Petiolus

eine nach vorn gerichtete Hervorwölbung mit einer schief orientierten etwa trapezförmigen Plattform, deren Ecken in hervorragende flache Zapfen auslaufen; die hinteren sind näher an einander gestellt und tragen je eine Borste; von oben betrachtet, ist der Petiolus beinahe parallelseitig. Postpetiolus im Profil buckelförmig gebogen, von oben betrachtet, etwa trapezförmig, abgerundet, vorn breiter, beinahe doppelt so breit wie der Petiolus. Gaster eiförmig, abgeflacht.

Kopf sehr oberflächlich, deutlicher auf der Stirn und etwas dahinter, längsgestreift, hinten ganz ungestreift, mit zerstreuten gröberen Punkten, sehr glatt und glänzend. Mandibeln glatt und glänzend, mit zerstreuten feinen Pünktchen. Thorax, Stielchenglieder und Gaster fast ganz glatt und sehr glänzend. Mit sehr spärlichen abstehenden Haaren, die fast nur oben verhanden sind. Auf der Unterseite des Kopfes spärliche kurze anliegende Pubeszenz, welche nur bei Profilansicht unterscheidbar ist. Hell gelblich rostfarben. — L. etwa 2 mm.

Bana bei Tourane, 1400 m, Zentralannam, 1. X. 1931, K. DAVYDOV, Nr. 5768, 1 ☿. — Col de Nuage, 600-700 m, Zentralannam, Sept. 1931, Derselbe, Nr. 5769, 1 ☿.

Triglyphothrix lanuginosa (MAYR).

Buitenzorg, Java, Botan. Garten, XII. 1912, W. KARAWAJEW, Nr. 5839, ☿☿, 1 flügelloses (Königin?) und 3 geflüg. ♀♀ und zahlreiche Larven und kokonlose Puppen.

Tetramorium infraspinosum sp. n.

☿. Kopf 1,16 mal so lang wie breit, parallelseitig, doch von den Augen an nach vorn bogenförmig verjüngt; Okzipitalrand ein wenig konkav, die Hinterecken mässig abgerundet. Der Vorderrand des Clypeus ohne Ausschnitt. Stirn breit (If = beinahe 3), die gröberen Runzeln, welche die Fortsetzung der Stirnleisten bilden, ziehen sich, anfänglich etwas bogenförmig, nach aussen, in der Richtung zu den Hinterecken. Stirnfeld deutlich abgegrenzt. Der Scapus erreicht nicht den Okzipitalrand um die doppelte Dicke an seiner Spitze. Augen ziemlich gross, birnförmig, gewölbt, vor der Mitte der Kopfseiten gelegen. Mandibeln mit 5-6 Zähnen, von denen die basalen undeutlich sind.

Thoraxprofil mässig gewölbt, mit kaum wahrnehmbarer Grenze zwischen Mesonotum und Epinotum; beide Abschnitte vollständig verschmolzen. Epinotumdornen im Profil dreieckig, zugespitzt, etwas hinaufgerichtet; von oben betrachtet, sind sie flach, divergent, etwa so lang wie deren gegenseitige Abstand an der Basis. Metathorakaldornen beinahe doppelt so lang wie die Epinotumdornen, spitz dreieckig, unter 45° gestellt, von oben betrachtet, einander parallel, mit etwas nach aussen gebogenen Spitzen. Petiolusknoten im Profil rechteckig, länger als der vordere, verjüngte, Teil des Petiolus, vom Unterrand des Petiolus gemessen, höher wie lang, das obere Profil vorn und hinten etwas abgerundet; von oben betrachtet, ist der Petiolusknoten breit-oval, deutlich länger wie breit, kaum weniger breit als die Basis des Petiolus, deren Begrenzung bei Ansicht von oben unterscheidbar ist. Postpetiolus, von oben betrachtet, breit oval, mehr

als 1½ mal breiter wie der Petiolusknoten; im Profil beinahe doppelt so hoch wie lang, unten mit einem nach vor gerichteten Zapfen.

Kopf und Thorax grob, scharf, weitläufig, netzartig gerunzelt, die Stirn hauptsächlich der Länge nach (etwa 10-11 Längsrunzeln), dazwischen mehr oder weniger deutlich punktiert. Der Thorax hauptsächlich oben netzartig gerunzelt, an den Seiten punktiert. Der Petiolusknoten mit einigen schwachen Längsrunzeln, punktiert, Postpetiolus mit groben unregelmässigen Längsrunzeln. Gaster beinahe glatt, glänzend; der übrige Körper, ungeachtet der Runzelung und Punktierung, halbglänzend. Anliegende Behaarung sehr spärlich, meistens fehlend; abstehende Haare kurz, mässig entwickelt. Gelblich rostfarben, die Gaster und die Anhänge lichter, gelblich. — L. etwa 2 mm.

Caûda, Cochinchine, 10. X. 1930, K. Davydov, Nr. 5788, 1 ♀.

Xiphomyrmex aruensis sp. n. (Abb. 24).

♀. Kopf 1,11 mal so lang wie breit (0,93 mm lang, 0,84 mm breit), mit ziemlich stark bogenförmig gewölbten Seiten und nur in der Mitte geradem Okzipitalrand, wodurch die Hinterecken stark bogenförmig gewölbt erscheinen. Der Clypeus garnicht gekielt; dessen mittlerer Abschnitt in der Querrichtung schwach bogenförmig gewölbt, seitlich und besonders hinten stark eingesenkt; ein Stirnfeld garnicht unterscheidbar. Mandibeln mit 3 grösseren dreieckigen vorderen Zähnen und 4 ganz winzigen, manchmal undeutlichen, dahinter. Der Scapus reicht um etwa das ¼ seiner Länge über den Okzipitalrand hinaus. Die breit ovalen, stark gewölbten, Augen liegen etwas vor der Mitte der Kopfseiten.

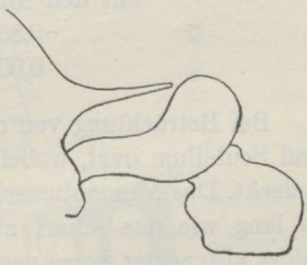


Abb. 24. — ♀ von *Xyphomyrmex aruensis*, sp. n.

Das Rückenprofil bogenförmig, hauptsächlich vorn gewölbt, die Pro-Mesonotum- und Meso-Epinotumgrenze nur seitlich unterscheidbar und daselbst kaum eingedrückt. Die Epinotumdornen dünn, lang und spitz, mässig hinaufgerichtet und mässig divergent. Das Profil der Stielchenglieder sieht man auf der beigelegten Abbildung; der Postpetiolus ist etwa 1½ mal so breit wie der Petiolusknoten, hinten breiter.

Zwischen den divergierenden Stirnleisten, welche hinten in je eine scharfe Längsrunzel übergehen, befinden sich 3-4 ebensolche Längsrunzeln, welche sich beinahe bis zum Okzipitalrand erstrecken, teilweise anastomosieren oder kleine Seitenäste unter scharfen Winkel abgeben; die mittlere Runzel kann vorn auch zweigabelig sein. Um die Augen herum ist die Runzelung feiner, dichter und mehr netzartig; noch dichter und feiner wird sie auf der Unterseite des Kopfes, woselbst die Längsrichtung der Runzeln fast ganz verloren geht. Die Kopfoberfläche zwischen den Runzeln ist auf der Oberseite des Kopfes beinahe ganz glatt und sehr glänzend, auf der Unterseite und auf dem mittleren Abschnitt des Clypeus zwischen den Runzeln mit undeutlicher Punktierung und daselbst weniger glänzend. Mandibeln undeutlich längsgestrichelt. Thorax netz-

artig gerunzelt. Auf dem Pronotum und Mesonotum ist das Netz weitmaschig, übrigens sehr dicht und dazwischen undeutlich punktiert, im ganzen ist der Thorax ziemlich glänzend. Stielchenglieder beinahe ganz glatt und glänzend; Gaster sehr glatt und glänzend. Mässig abstehend behaart; auf der Oberseite des Kopfes stehen die Haare hinaufgerichtet, übrigens schief. Gelblich-rötlichbraun, der Kopf und die Gaster dunkler. — L. bei geneigtem Kopf etwa 3,25-3,5 mm.

Wammar, Aroe Archipel, 9. III. 1913, W. KARAWAJEW, Nr. 2567, Kolonie in einem morschen Baumstamm, zahlreiche ☿☿. Die Ameisen haben scheinbar Gänge benutzt, welche eine fremde Larve ausgenagt hat.

Strumigenys (Strumigenys) godeffroyi MAYR.

♀. Im folgenden gebe ich eine Vervollständigung der Beschreibung dieser Art.

Der gesamte Körperbau, samt dem Kopf, ist massiver als beim ☿. Die Mandibeln sind etwas dicker und länger, ebenfalls das Endglied des Funiculus. Von den drei Zähnen der Mandibeln ist der mittlere der längste, die zwei übrigen etwa gleich lang (bei dem ☿ ist der Endzahn der kürzeste, die zwei übrigen etwa gleich lang).

Die Kopfmasse sind:

	Allgemeine Kopflänge mit den Mandibeln	Kopflänge ohne Mandibeln	Kopfbreite
☿	0,85	0,58	0,4
♀	0,93	0,65	0,45

Bei Betrachtung von oben ist das Mesonotumschild mit dem Proscutellum und Scutellum oval, wobei das letztere einen bedeutenden Teil des Epinotums bedeckt. Das Mesonotumschild mit dem Proscutellum zusammen ist etwa doppelt so lang wie das scharf abgesonderte halbovale Scutellumschild (das letztere bildet also seiner Form nach ein in der Mitte quergeteiltes Oval). Das Mesonotumschild wird vorn wie von einer wulstartigen Kappe von dem Pronotum umfasst, welches sich vorn in den Halsabschnitt verlängert. Uebrigens etwa dem ☿ gleich. — L. meiner ☿ etwas mehr als 2 mm, die der ♀ 2,5 mm.

Höchtswahrscheinlich Sumatra, Siak, O. JOHN, Nr. 5407. Zahlreiche ☿☿ und 2 flügellose ♀.

Strumigenys (Cephaloxys) emeryi sp. n. (Abb. 25).

♀. Kopf 1,23 mal so lang wie breit, von einer Form, welche ohne Beschreibung auf der beiliegenden Abbildung zu sehen ist. Der Scapus, welcher sich bis etwa ⅔ der Länge der Kopfseiten erstreckt, liegt in einer breiten Furche, welche auf der seitlichen Ansicht des Kopfes gut unterscheidbar ist; der obere Rand dieser Furche entspricht der seitlichen Begrenzung des Kopfschildes, welcher bei Frontalansicht die breit-ovalen Augen ganz bedeckt; die letzteren liegen der Unterseite des Kopfes genähert, so dass deren Vorderrand etwa mit der

Mitte des Seitenrandes zusammenfällt; die Unterseite des Kopfes ist seitlich vor dem Auge durch einen schwachen Kiel begrenzt, welcher sich vom unteren Rand des Auges bis zur Artikulation der Mandibel zieht; dieser Kiel ist auf der seitlichen Ansicht des Kopfes gut unterscheidbar. Der Scapus ist schlank gebaut; das Endglied des Funiculus ist deutlich länger als die übrigen 4 Funiculusglieder zusammengenommen.

Das Pronotum bildet ein Paar deutlicher Beulen. Das Scutellum is stark aufgetrieben, hinten buckelig über das schmale Metanotum hinausragend; von oben betrachtet, ist es etwa trapezförmig, hinten schmäler, stark abgerundet. Epinotumdornen dünn und spitz, an der Basis breit. Hinter dem Epinotumstigma zieht sich eine senkrechte stark eingesenkte Furche. Der vordere zylindrische

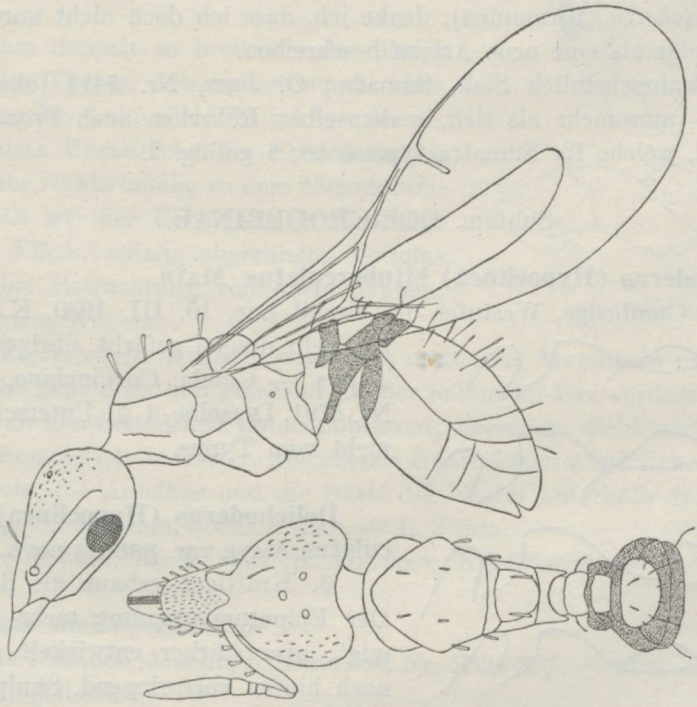


Abb. 25. — ♀ von *Strumigenys (Cephaloxys) emeryi*, sp. n.

Abschnitt des Petiolus ist sehr lang; der Knoten, von oben betrachtet, halb so breit wie der etwa querovale Postpetiolusknoten. Die Stielchenglieder und die Basis der Gaster mit zahlreichen stark entwickelten schwammförmigen membranösen Anhängen.

Kopf grob und dicht fingerhutartig punktiert, durchaus matt; der Clypeus unregelmässig fein punktiert, ebenfalls matt; die Mandibeln ziemlich glatt, halbmatt, mit feinsten anliegenden Härchen. Thorax und Petiolus feiner als der Kopf punktiert, matt. Postpetiolus ziemlich glatt und glänzend. Mit langen dünnen und kürzeren kolbenförmigen Haaren, welche möglichst getreu nach der Natur abgebildet sind; teilweise fehlen sie selbstverständlich; besonders

grosse kolbenförmige Haare (besser — Anhänge) befinden sich auf dem äusseren Rand des Scapus. Funiculus und Beine mit gewöhnlichen anliegenden Haaren. Gelblich ockerfarben.

Flügel etwas gelblich, an dem Hinterrand des Hinterflügels eine Reihe besonders langer Haare. Der Vorderrand des Vorderflügels konkav; nur eine vorn geschlossene Medianzelle; vom Pterostigma zieht sich nach innen eine kurze Ader, welche die fehlenden 1. Cubitalzelle und Radialzelle trennen sollte. Auf dem schmalen Hinterflügel nur eine Subcostalader. — L. mit ausgestrecktem Kopf kaum mehr als 2 mm; L. der Vorderflügel etwas mehr als 1,5 mm.

Steht scheinbar nahe zu *dohertii* EM., welche leider nur mit einigen Worten charakterisiert ist, kleiner als der ♀ der letzteren. In Anbetracht der entfernten patria von *dohertii* (Birmanien), denke ich, dass ich doch nicht unrecht habe, mein Exemplar als eine neue Art zu beschreiben.

Höchstwahrscheinlich Siak, Sumatra, O. JOHN, Nr. 5414 (ohne Patria-Angabe), — umsomehr als sich in demselben Röhrchen auch *Proatta butteli* FOR. befand, welche für Sumatra typisch ist. 1 geflüg. ♀.

Subfam. DOLICHODERINAE.

Dolichoderus (Hypoclinea) bituberculatus MAYR.

Pursat, Cambodge, Westufer des Grand Lac, 10. III. 1930, K. DAVYDOV, 1 ♀. Sehr dunkel gefärbt, übrigens wie der Typus. — Caûda, Cochinchine, XI. 1931, Nr. 5791, Derselbe, 1 ♀. Unterscheidet sich nicht vom Typus.

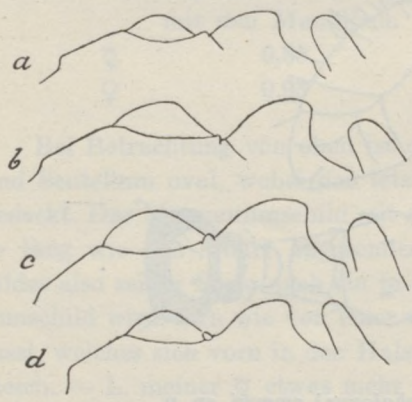


Abb. 26. — *a* Thoraxprofil des ♀ von *Dolichoderus (Hypoclinea) bituberculatus* MAYR, Buitenzorg; *b* desgleichen von *D. bituberc.* var. *nasuta* nova; *c* desgl. von var. *brunnea* KAR., Tapoengkiri, Sumatra; *d* desgl. von var. *emarginata* SANT., Lous.

Dolichoderus (Hypoclinea) bituberculatus MAYR var. **nasuta** nova (Abb. 26).

♀. Kräftiger gebaut als der Typus. Der Epinotumvorsprung mehr „nasenförmig", also stärker entwickelt und mehr nach hinten vorspringend. Skulptur etwas gröber. Der Kopf, mit Ausnahme des vorderen Abschnittes und der Mandibeln, viel dunkler gefärbt, beinahe schwarz.

Bokkor, Cambodge, Prov. Kampot, Chaîne d'Eléphant, 1080, m, in der Nähe des Golfes von Siam.

Iridomyrmex anceps ROG.

Caûda, Cochinchine, K. DAVYDOV, 1 ♀.

Iridomyrmex laevigatus EM.

Soui Dau, in der Nähe von Nhatrang, Cochinchine, K. DAVYDOV, Nr. 5794, 1 ♀. — Insel Phuquoe, Duondong, Golf von Siam, Derselbe, 26. XI. 1931, 3 ♀.

Tapinoma epinotalis sp. n. (Abb. 27).

☿. Kopf so lang wie breit, mit sehr gewölbten Seiten, vorn viel schmäler wie hinten, mit sehr konkavem Okzipitalrand und abgerundeten Hinterecken. Clypeus in der Mitte in longitudinaler und transversaler Richtung gewölbt; dessen Vorderrand gerade, mit ziemlich starkem halb kreisförmigen Ausschnitt. Stirn breit, mit bogenförmig divergierenden Leisten. Stirnfeld nur vorn deutlich abgegrenzt. Der Scapus überreicht den Okzipitalrand um die doppelte Dicke an seinem Ende. Mandibeln mit kurzem Hinterrand und langem gebogenen Kaurand, welcher mit etwa 14 spitzen Zähnchen besetzt ist. Augen gross, flach, vor der Mitte der Kopfseiten gelegen.

Pronotum doppelt so breit wie der übrige Abschnitt des Thorax. Mesoepinotumnaht oben stark eingesenkt, hauptsächlich infolge dessen, dass die kurze Basalfläche des Epinotums im Profil beinahe rechtwinkelig zu dem Mesonotumprofil gestellt ist; der Uebergang in die lange abschüssige Fläche mässig abgerundet. Petiolus lang, mit, bei Betrachtung von oben, ovalem, stark geneigten, Knoten.

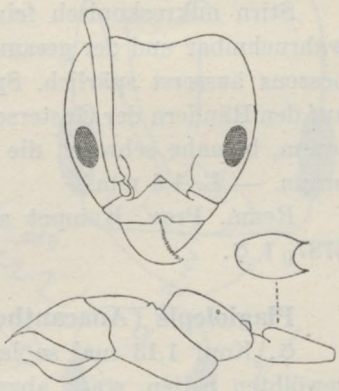


Abb. 27. — ☿ von *Tapinoma epinotalis*, sp. n.

Mikroskopisch fein netzartig punktiert, matt. Die Mandibeln und der Petiolus beinahe ganz glatt und glänzend, Gaster halbmatt. Der vordere Abschnitt des Kopfes an den Seiten und unten pubeszent; besonders dicht und mit einer langeren Pubeszenz ist die Gaster. Abstehende Haare äusserst spärlich. Bräunlich, die Mandibeln, die Anhänge und die Basis der Gaster unterhalb des vorderen Vorsprungs gelblich braun, etwas rötlich. — L. 3 mm.

Phu-Ho, Tonkin, 10. X. 1931, K. Davydov, Nr. 5780, 2 ☿.

Tapinoma melanocephalum F.

Cay Dua Phuquoe, Annam, K. Davydov, Nr. 5766, 3 ☿. — Ebenda, derselbe, Nr. 5767, 1 flügelloses ☿.

Subfam. CAMPONOTINAE.

Anoplolepis (Anoplolepis) longipes (Jerd.).

Lien Cheû bei Tourane an der Basis von Col de Nuage, Zentralannam, K. Davydov, Nr. 5764, 3 ☿. — Ream, Prov. Kampot am Golf von Siam, Cambodge, Nr. 5775, 3 ☿. — Insel Phuquoe, Duondong, im Golf von Siam, Derselbe, Nr. 5776, 1 ☿. — Archip. Poulo Condore südlich von Saigon, Derselbe, 1 ☿.

Plagiolepis (Plagiolepis) nitida sp. n.

☿. Kopf 1,17 mal so lang wie breit, beinahe parallelseitig, vorn kaum verjüngt, mit schwach gewölbten Seiten, mässig abgerundeten Hinterecken und ge-

radem Okzipitalrand. Clypeus mit bogenförmigen Vorderrand, deutlich gekielt. Stirnfeld deutlich abgegrenzt. Der Scapus überreicht den Okzipitalrand um etwa das ¼ seiner Länge.

Thoraxprofil wie bei *P. rothneyi* FOR., wie er bei EMERY (Gen. Ins., Formicinae, 1925, tab. 1, fig. 20) abgebildet ist, aber die Metanotumhöcker mit dem Stigma sind nur mässig vorgewölbt, weshalb ich die Art zu der Untergattung *Plagiolepis* stelle.

Stirn mikroskopisch fein punktiert. Uebrigens ist die Punktierung kaum wahrnehmbar und der gesamte Körper sehr glatt und glänzend. Anliegende Pubeszenz äusserst spärlich. Spärliche abstehende Haare auf dem Clypeus und auf den Rändern der Gastersegmente, woselbst sie sehr dick sind. Dunkel kaffeebraun, beinahe schwarz, die Fühler und Beine, besonders die Tarsen, gelblich braun. — L. 1,5 mm.

Ream, Prov. Kampot am Golf von Siam, Cambodge, K. DAVYDOV, Nr. 5787, 1 ☿.

Plagiolepis (Anacantholepis) flava sp. n.

☿. Kopf 1,13 mal so lang wie breit, hinten deutlich breiter, mit mässig gewölbten Seiten, stark abgerundeten Hinterecken und in der Mitte geradem Okzipitalrand. Der Clypeus in beiden Richtungen gewölbt ohne Kiel, mit bogenförmigem Vorderrand. Stirn kurz, mit parallelen geraden Leisten (If = 3,2). Stirnfeld dreieckig, ganz hinten nicht abgegrenzt. Der Scapus überragt den Okzipitalrand um ¼ seiner Länge. Die beinahe kreisrunden Augen liegen vor der Mitte der Kopfseiten; deren Durchmesser ist bei Ansicht des Kopfes von vorn etwas grösser als der Abstand des Vorderrandes des Auges vom Hinterrand des Clypeus.

Thoraxprofil ganz wie bei *P. rothneyi* FOR., wie derselbe bei EMERY (Gen. Insect., Formicinae, 1925, Tab. 1, fig. 20) abgebildet ist, nur ist das Epinotum mehr gewölbt; ausserdem liegt das Epinotumstigma bei Ansicht von der Seite ganz am Epinotumprofil.

Ganz glatt und glänzend. Dichte sehr kurze anliegende Härchen auf dem Kopf (nur bei seitlicher Ansicht unterscheidbar), längere auf den Anhängen und der Gaster, woselbst sie spärlich sind. Lange sehr spärliche abstehende Haare auf dem Clypeus, einige auf dem Hinterhaupt und auf dem Hinterrand der Gastersegmente. Gelb (wie *Lasius flavus*), die Funiculi bräunlich; ein dunkelbrauner Streifen am Hinterrand des 4. Gastersegmentes.

Lien Cheû bei Tourane, an der Basis von Col de Nuage, Zentralannam, IX. 1931, K. DAVYDOV, Nr. 5799, 2 ☿. — Arbre Broyé, 1500 m, Lang Biang, Südannam, Derselbe, Nr. 5800, 1 ☿.

Acropyga (Atopodon) distinguenda sp. n. (Abb. 28).

☿. Der Abstand zwischen dem Basalzahn der Mandibeln und dem nächsten ist deutlich tiefer und dadurch breiter als bei den übrigen Zähnen, der Basalzahn ist aber an seiner Spitze nicht abgerundet, sondern schief abgestutzt. Der Kopf

ist 1,17 mal so lang wie breit, parallelseitig, mit schwach gewölbten Seiten, schwach abgerundeten Hinterecken und beinahe geradem, kaum konkavem, Okzipitalrand. Der mittlere Abschnitt des Clypeus ist sowohl seitlich als auch vorn (vom Vorderrand des Clypeus) scharf abgegrenzt. Das Endglied des Funiculus ist so lang wie die beiden vorhergehenden zusammengenommen + die Hälfte des drittletzten. Die winzigen Augen liegen etwas vor der Grenze des 1. und 2. Drittels der Kopflänge; bei dem betreffenden Exemplar besteht das eine Auge aus etwa 3 schlecht unterscheidbaren atrophischen Facetten, das andere aus 6.

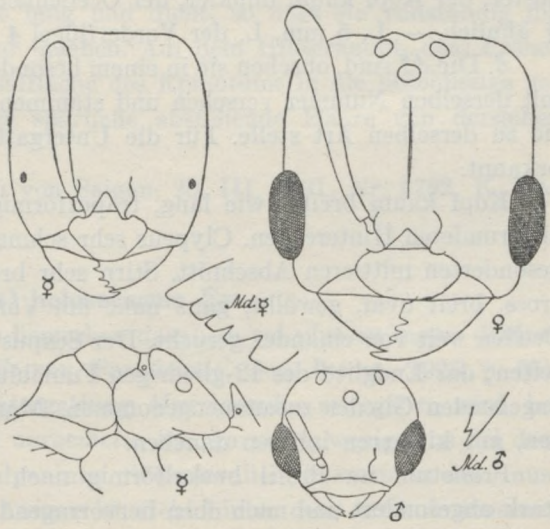


Abb. 28. — *Acropyga (Atopodon) distinguenda*, sp. n.

Das Thoraxprofil ist bukkelig, mit einem kleinen Eindruck, welcher der Promesonozum-Naht entspricht und einem grösseren im Gebiet des kurzen Metanotum, welches von dem Mesonotumschild durch eine feine aber deutliche Naht abgegrenzt ist; unterhalb des kleinen Stigmas sieht man eine kurze Naht, welche daselbst das zusammengeschmolzene II. Epimerit und II. Episternit abgrenzt; unten sieht man eine kurze Naht zwischen der Basis der Episternite II und III; übrigens sind die Episternite II und III, Epimerite II und III und das Epinotum zusammengeschmolzen. Das Epinotum besitzt ein sehr grosses rundes Stigma. Die Petiolusschuppe ist mit einem scharfen bogenförmigen Oberrand; vorn ist sie gewölbt, hinten flach.

Dicht anliegend behaart, wobei die Härchen mikroskopisch feinen Pünktchen entspringen, übrigens beinahe ganz glatt und glänzend; abstehende Haare äusserst spärlich. Flaugelb, nur der Vorderrand des Clypeus und die Ränder der Mandibeln, besonders deren Kaurand, dunkelbraun. — L. 2,5-3 mm.

♀. Kopf beinahe quadratisch, kaum länger wie breit. Der mittlere Abschnitt des Clypeus lang oval, der Vorderrand des Clypeus beinahe gerade. Der Scapus überreicht den Okzipitalrand um die 1½ Dicke an seinem Ende. Augen gross, breit oval, mässig gewölbt, nahe am Vorderende der Kopfseiten gelegen; dieselben sind vor dem Auge stark bogenförmig gewölbt. Ocellen auf den Abhängen des Ocellenhöckers.

Thoraxprofil oben ziemlich flach. Episternit II und Epimerit II breit, scharf von einander und dem Metathorax abgegrenzt; der Epimerit doppelt so hoch wie der Episternit. Petiolusschuppe im Profil dick, oben zugespitzt, von hinten betrachtet oben trapezförmig begrenzt. Vorderflügel mit einer Kubitalzelle; bei

einem Exemplar befindet sich an dem Vorderflügel der einen Seite distal von der Kubitalzelle, unterhalb des Randmals, eine kleine dreieckige anormale Zelle. Flügel gelblich gebräunt, mit blassem gelblichen Geäder. Die anliegende Pubeszenz länger und reichlicher als beim ☿, wodurch der Körper halbmatt erscheint; der Kopf muss aber doch als halbglänzend bezeichnet werden. Bräunlich gelb, düster, der Kopf kaum dunkler, der Ocellenhöcker dunkelbraun. Uebrigens dem ☿ ähnlich. — L. 5 mm, L. der Vorderflügel 4 mm.

♂. Die ♂♂ sind, obschon sie in einem besonderen Röhrchen aufgehoben waren, mit derselben Nummer versehen und stammen aus demselben Ort, weshalb ich sie zu derselben Art stelle. Für die Untergattung *Atopodon* war noch kein ♂ bekannt.

Kopf kaum breiter wie lang, trapezförmig, vorn viel schmäler, mit stark abgerundeten Hinterecken. Clypeus sehr schmal, vorn beinahe gerade, ohne abgesonderten mittleren Abschnitt. Stirn sehr breit (If = etwa 3,5). Augen sehr gross, breit oval, gewölbt, ganz nahe am Vorderende der Kopfseiten gelegen. Ocellen weit von einander gerückt. Der Scapus erreicht ⅔ der Länge der Kopfseiten; das Endglied des 12-gliedrigen Funiculus ist so lang wie die beiden vorangehenden Glieder zusammengenommen. Mandibeln etwas sichelförmig gebogen, mit kleineren inneren daneben.

Pronotum im Profil buckelförmig nach vorn hervorragend, Mesonotum stark abgesondert und nach oben hervorragend, Basalfläche des Epinotums und dessen abschüssige Fläche unter stumpfem Winkel zu einander orientiert; der Uebergang etwas abgerundet. Episternit II und Epimerit II scharf gegen einander und den Metathorax abgesondert. Petiolusschuppe ziemlich aufrecht.

Aeusserst fein punktiert, glatt und ziemlich glänzend. Gelblich kaffeebraun, Kopf dunkler, Anhänge blass. Anliegende Pubeszenz sehr kurz, dicht, aber wenig auffallend. Flügel etwas bräunlich, Geäder wie beim ♀, aber noch blasser. — L. 2,2 mm, L. der Vorderfügel 2 mm.

Phu-Ho, Tonkin, 11. X. 1931, K. DAVYDOV, Nr. 5785, 1 ☿. — Ebenda, 25. XI. 1931, derselbe, 4 ☿, 4 geflüg. ♀ und 4 ♂.

Oecophylla smaragdina (F.).

Suoi Javu, Nahe von Nhatrang S. Annam, K. DAVYDOV, 30. VI. 1930, Nr. 5724. 1 flügelloses ♀, nur 15 mm lang. Aus Assam besitze ich ein flügelloses ♀ (von FOREL bestimmt) von 17 mm Länge. — Buitenzorg, Botan. Garten, W. KARAWAJEW, Nr. 4680. ☿☿ in enormer Anzahl, sämtlich aus einem Nest, welches sich auf einem kleinen Bäumchen mit sehr grossen Blättern befand. Ich habe auch das Nest mitgebracht. Die ☿☿ sind deutlich dunkler (etwas bräunlich) als Exemplare, die ich von Peradenyia, Ceylon (Nr. 4679), von K. ESCHERICH gesammelt und von A. FOREL bestimmt, besitze. Sie bilden einen Uebergang zu der unten beschriebenen var. *fuscoides*.

Oecophylla smaragdina (F.) var. **fuscoides** nova.

☿. Düster rötlichbraun gefärbt, doch nicht so dunkel wie var. *fusca* EM.

Bantam, Westspitze von Java. Küste an der Soendastrasse, 7. I. 1913, W. KARAWAJEW, Nr. 2396. Einige ☿☿, von derselben Grösse wie die vorigen.

Camponotus (Colobopsis) auratus sp. n.

☿ minor. Das Profil der Basalfläche des Epinotums ganz gerade (bei dem nahestehenden *C. cylindricus* [FB.] kaum eingedrückt).

Körperfarbe dunkel kaffeebraun, beinahe schwarz. Mit dichten anliegenden goldgelben Haaren auf dem Hinterhaupt, dem Thorax und Petiolus; auf der Gaster sind die Haare besonders lang und dicht, so dass sie vollständig die Oberfläche des Körpers unsichtbar machen. Auf dem Hinterhaupt, dem Pronotum und dem Uebergang der Basalfläche des Epinotums in die abschüssige gesellen sich dazu noch sehr lange spärliche abstehende Haare von derselben Farbe. — L. 4 mm.

Insel Poulo Condore, südlich von Saigon, 20. III. 1931, Nr. 5792, K. DAVYDOV, 1 ☿ minor.

Camponotus (Myrmosaulus) holosericeus EM.

☿. In betreff des ☿ muss ich bemerken dass „un col plus ou moins distinct qui s'articule avec le corselet" (EMERY, Formicinae, Gen. Insect., 1925, p. 65), ein Merkmal, welches für die Untergattung *Myrmosaulus* angegeben wird, bei dieser Art sehr schwach (und bei *aurocinctus* SM. garnicht, wenigstens bei dem bei mir vorhandenen ☿ aus Killalpaninno, Südaustralien, VIEHMEYER det.) ausgeprägt ist. Bei meinen ☿☿ aus Annam ist dicht hinter dem Artikulationsrand des Kopfes oben nur eine sehr schwache Quereinsenkung unterscheidbar.

☿. Kopf 4,4 mm lang (bis zum Ausschnitt des Okzipitalrandes gemessen) und 4,5 mm breit. Zwischen der Stiel und dem Okzipitalrand, dort wo die hinteren Ocellen sich befinden sollten, ist ein Paar breiter trichterförmiger Eindrücke vorhanden. Die Basalfläche des Epinotums ist im Profil nicht bogenförmig, wie das bei BINGHAM (The Fauna of British India, Hym. vol. 2, 1903, fig. 113, p. 374) abgebildet ist, sondern auf einer geringeren Strecke begrenzt.

Lang Biang, 1500 m (Dalat), Südannam, 2. II. 1931, K. DAVYDOV, einige ☿☿ und ☿☿.

Die Art ist für Assam und Birmanien bekannt.

Polyrhachis (Myrmhopla) armata LE GUILL.

Ream, Prov. Kampot, Cambodge, am Golf von Siam, II. 1930, K. DAVYDOV, Nr. 5730, 3 ☿. — Loeninch, Nordcochinchine, an der Grenze von Cambodge, 10. XII. 1931, Derselbe, Nr. 5752, 1 ☿.

Polyrhachis (Myrmhopla) armata LE GUILL. var. **defensa** SM.

Bana bei Tourane, 500-800 m, Zentralannam, 27. IX. 1931, K. DAVYDOV, Nr. 5753, 2 ☿. — Yambai, Tonkin, Derselbe, Nr. 2148, 1 ☿. Von F. SANTSCHI erhalten und von ihm als *armata* bestimmt. Die Gaster ist bei diesem Exemplar deutlich rötlich gefärbt, doch bei den oben genannten Exemplaren von Bana ist sie noch rötlicher.

Polyrhachis (Myrmhopla) bicolor SM.

P. (Myrmhopla) bicolor: KARAWAJEW, Mém. Cl. Sci. Phys.-Math. (Acad. Sci. Ukraine), Bd. 7, 1927, p. 34 = Travaux du Musée Zool. Nr. 3, 1927, p. 34 (partim).

Ich nehme an, dass die Exemplare von Buitenzorg (W. KARAWAJEW, Nr. 2382) der typischen Form entsprechen, das kann aber keinenfalls als sicher festgestellt werden.

Polyrhachis (Myrmhopla) bicolor SM. var. **erecta** nova.

P. (Myrmhopla) bicolor SM. (var.?): KARAWAJEW, Mém. Cl. Sci. Phys.-Math. (Acad. Sci. Ukraine), Bd. 7, 1927, p. 34 = Travaux du Musée Zool. Nr. 3, 1927, p. 34.

Westspitze von Java an der Soendastrasse, gegenüber Meeuwen Eiland, Bantam. W. KARAWAJEW, Nr. 2396, 1 ☿. — Tifoe auf der Insel Boeroe, derselbe, Nr. 2436, 1 ☿.

Polyrhachis (Myrmhopla) bicolor SM. var. **brachyacantha** nova.

☿. Sämtliche Dornen kürzer als bei dem Typus und den übrigen hier genannten Varietäten, die Epinotumdornen nur 0,25 mm lang, ziemlich aufrecht gestellt und einander beinahe ganz parallel. Uebrigens wie der Typus.

Koh-Kohn an der Grenze von Siam, Cambodge, 29. XI. 1931, K. DAVYDOV, Nr. 5782, 2 ☿.

Polyrhachis (Myrmhopla) bicolor SM. var. **aurata** nova.

P. (Myrmhopla) bicolor: KARAWAJEW, Mém. Cl. Sci. Phys.-Math. (Acad. Sci. Ukraine), Bd. 7, 1927, p. 34 = Travaux du Musée Zool. Nr. 3, 1927, p. 34 (partim).

☿. Deutlich grösser als der Typus. Thoraxlänge 2,3 mm gegen etwa 2 mm bei meinen Exemplaren des vermeintlichen Typus von Buitenzorg (Nr. 2382). Dornen deutlich länger und sämtlich etwas nach innen gebogen. Die Pubeszenz auf der Gaster etwas kürzer. Die Färbung der Gaster und der Anhänge heller, mehr ockerfarben.

Depok bei Buitenzorg, W. Java, W. KARAWAJEW, 12. XII. 1912, Nr. 2350, zahlreiche ☿☿. — Ebenda, derselbe, Nr. 3119, 1 geflüg. ♀.

Polyrhachis (Aulacomyrma) mystica KARAW. (Pl. 2*c-d*).

Das Nest dieser von mir beschriebenen Art habe ich schon früher beschrieben (Mém. Cl. Sci. Phys. et Math., Acad. Sci. Ukraine, vol. 6, 1928, tab. 5, fig. 39), es war aber ein ganz kleines unansehnliches Nestchen. Später habe ich in meinem Material noch eine Reihe bedeutend grösserer und mehr typischer Nester dieser Ameise gefunden, die ich früher als verloren hielt. Ich benutze jetzt die Gelegenheit diese Nester zu beschreiben und zwei photographische Aufnahmen von einem derselben zu reproduzieren.

Sämtliche Nester, sechs an der Zahl, stellen flache Gebilde von sehr unregelmässiger Form, im allgemeinen etwas verlängert, dar. Der grösste Längsdurchmesser derselben ist 12,5 cm. Sie bestehen aus zwei parallelen Lamellen, von denen die äussere kaum dicker ist, aber durch eine sehr rauhe Oberfläche ausgezeichnet ist; diese Rauheit verdankt sie dem Umstand dass in die Lamelle verschiedene pflanzliche Teilchen, wie Stückchen von Baumrinde und dgl. ein-

gewoben sind. Die allgemeine äussere Beschaffenheit und Färbung der Oberfläche entspricht sehr der grauen Rinde eines Baumstammes, an welche die Nester angebracht werden. Von innen ist die äussere Nestwand mit dem hellbräunlichen (sandfarbenen) Gespinnst der Larven dieser Weberameise bedeckt, welches alle Unebenheiten der Oberfläche regelmässig ausfüllt. Die Innenwand des Nestes ist dünn wie Zigarettenpapier, von derselben hellbräunlichen Farbe und besteht fast aus reinem Gespinnst. Sie liegt dicht der Oberfläche der Rinde des Baumstammes auf und wiedergibt deren sämtliche Unebenheiten. Eins von diesen sechs Nestern ist auf der Tafel bei *c* und *d* dargestellt; *c* ist die Ansicht des Nestes von aussen und *d* von innen, wobei bei *d* ein beträchtlicher Teil der Innenwand ausgeschnitten ist; den Schnittrand sieht man besonders deutlich oben. Am seitlichen Rand dieses Nestes sieht man vier Eingangsröhrchen (deren Durchmesser 2 mm beträgt); andere Nester besitzen etwa ebensoviel Eingangsöffnungen, welche sich ausschliesslich am Nestrand befinden, übrigens aber sehr verschieden verteilt sind. Die beiden Abbildungen des Nestes sind verkleinert; der wirkliche Längsdurchmesser dieses Nestes beträgt 7,5 cm.

Polyrhachis (Cephalomyrma subg. nov.).

☿. Kopf sehr gross, länger wie breit. Stirn in der Mitte eingeschnürt. Augen oval, sehr gross, am Okzipitalrand liegend. Mandibeln mit ziemlich schmalem Kaurand. (Antennen unbekannt).

Thoraxrücken im Gebiet des Promesonotums in der Querrichtung konvex, der ganzen Länge nach mit sehr schwachem, aber deutlichen, abgerundeten, Seitenrand. Meso-, Metathorax und Epinotum ganz zusammengewachsen. Pronotum mit einem Paar kurzer Spitzen, Epinotum mit längeren Dornen. Petiolusschuppe mit einem Paar äusserer, grösserer, stielförmiger abgestutzter Dornen und einem Paar kleiner innerer Vorsprünge.

Steht der Untergattung *Myrmhopla* am nächsten.

Polyrhachis (Cephalomyrma) stylifera sp. n. (Abb. 29).

☿. Kopf 1,24 mal so lang wie breit. Die Stirn erstreckt sich bis zur Mitte der Augen, ist hinten ebenso breit wie vorn, in der Mitte stark eingeschnürt. Die Antennen artikulieren etwas vor deren Mitte. Clypeus sehr schwach aber deutlich gekielt. Mandibeln 4-zähnig. Augen oval, gross, mässig konvex, an den Hinterecken des Kopfes gelegen.

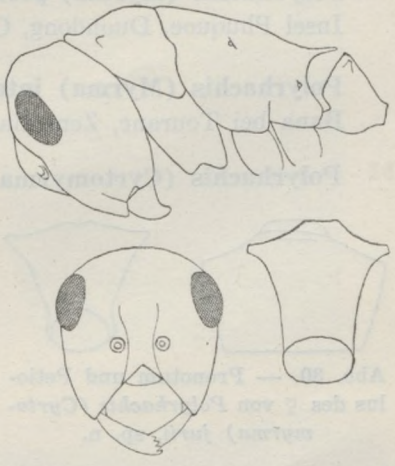


Abb. 29. — ☿ von *Polyrhachis (Cephalomyrma) stylifera*, subg. et sp. n.

Profil des Thoraxrückens hinter der Promesonotum-Naht beinahe geradlinig. Dicht hinter dem Metathoraxstigma eine kurze schräge eingesenkte Linie, welche der Grenze mit dem Epinotum ent-

spricht. Ueber die Beschaffenheit des Thoraxrückens vgl. die Diagnose der Untergattung. Das Rückenprofil an der Mesoepinotumgrenze ist etwas eingeschnürt. Basalfläche des Epinotums flach. Pronotum mit langen spitzen Dornen, welche an der Basis etwas verbreitert und gerade nach hinten gerichtet sind. Der Petiolus ist im Profil dreieckig, unten bogenförmig begrenzt. Bei Ansicht der Länge nach ist er länglich, oben breiter, in ein Paar stielförmiger, an der Spitze abgestutzter, Dornen ausgezogen; am zugespitzten bogenförmigen Oberrand befindet sich ein Paar kleiner Wärzchen.

Fein netzartig punktiert, am feinsten die Gaster. Kopf, Thorax, Petiolus, Hüften und Tarsen schwarz, Schenkel, Schienen und Gaster rötlich braun. Kopf, Thorax und teilweise Petiolus dicht und ziemlich lang weiss anliegend behaart, dessen ungeachtet die genannten Körperteile doch schwärzlich erscheinen. Gaster äusserst kurz aber dicht weisslich anliegend behaart. Abstehende Haare fehlen beinahe gänzlich. — L. etwas mehr als 5 mm.

Ream, Prov. Kampot, Cambodge, am Golf von Siam, K. DAVYDOV, Nr. 5725, 1 ♀ mit abgebrochenen Antennen.

Polyrhachis (Myrma) mayri ROG.

Bokkor, Cambodge, Chaîne d'Elephant, 1080 m, in der Nähe des Golfes von Siam, K. DAVYDOV, Nr. 5676, einige ♀♀. In Vergleich mit in meiner Sammlung vorhandenen Exemplaren von Java, Sumatra und Amboina haben diese Exemplare einen nicht so sehr ausgeprägten seidenartigen Schimmer und sie sind dabei mehr grünlich olivenfarben. Die vorhandenen Exemplare sind auch etwas kleiner.

Polyrhachis (Myrma) proxima FOR.

Insel Phuquoe, Duondong, Golf von Siam, K. DAVYDOV, Nr. 5682 1 ♀.

Polyrhachis (Myrma) intermedia FOR.

Bana bei Tourane, Zentralannam, 27. IX. 1931, K. DAVYDOV, 1 ♀.

Polyrhachis (Cyrtomyrma) jurii sp. n. (Abb. 30).

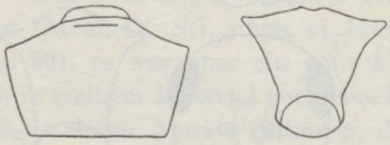


Abb. 30. — Pronotum und Petiolus des ♀ von *Polyrhachis (Cyrtomyrma) jurii*, sp. n.

♀. Pronotum mit spitzen Ecken. Petiolusschuppe trapezförmig, in der Mitte des oberen bogenförmigen Randes nur seicht ausgerandet, mit langen, ziemlich spitzen, seitlichen Dornen.

Mikroskopisch fein oberflächlich querchagriniert; der untere Abschnitt der abschüssigen Fläche des Epinotums etwas gröber chagriniert, sehr glänzend. Pechschwarz, die Hüften, Schenkel und Schienen rötlich braun, die Tarsen dagegen schwarz. — L. 7 mm.

Steht am nächsten zu *laevissima* SM.

Ream, Prov. Kampot, Cambodge, am Golf von Siam, K. DAVYDOV, Nr. 5781, 1 ♀.

Einige Berichtigungen

Dieselben beziehen sich auf meine Arbeit in der Treubia, Vol. 8, 1926, pp. 413-445.

Statt *Eciton* (*Aenictus*) *ceylonicus*, p. 422 und den anderen daselbst genannten Arten muss man lesen *Aenictus ceylonicus* etc.

Dolichoderus (*Diabolus*) *bifurcatus* gehört nicht zu einer neuen Untergattung und Art. Diese Ameise steht nahe zu *Dolichoderus* (*Hypoclinea*) *cuspidatus* Sm. Bei der letztgenannten Art hat das Mesonotum nach Mayr (Verh. Zool.-botan. Ges. Wien, vol. 20, 1870, p. 955) zwei aufrechte Dornen; über die Beschaffenheit der Epinotumdornen sagt Mayr nichts. Die Arbeit Smith's mit der Originaldiagnose besitze ich nicht, da aber die Diagnosen dieses Verfassers bekanntlich überhaupt zu unvollständig und unzuverlässig sind, so hat das keine grosse Bedeutung. Bei meinen Exemplaren stehen die zwei Dornen des Mesonotums auf einer gemeinsamen aufrechten Basis und sind quer nach aussen gerichtet, wie das auf meiner entsprechenden Abbildung zu sehen ist; dasselbe gilt auch für die Dornen des Epinotums. Wenn der Ausdruck von Mayr in betreff der Mesonotumdornen genau zu verstehen ist, so stellen meine Exemplare einen deutlichen Unterschied dar und müssen dann meiner Ansicht nach doch zu einer neuen Unterart oder wenigstens Varietät gestellt werden, für welche meine Bezeichnung *bifurcatus* zurechte bleibt.

Die Bezeichnungen der *Dorylinae* und *Dolichoderinae* als „Fam." ist selbstverständlich ein unbemerkter Druckfehler: es muss in beiden Fällen „Subfam." (Subfamilie) stehen.

TAFELERKLÄRUNG

a — Eingangsöffnung des Nestes von *Pheidologeton affinis* auf einem Gartenweg. Buitenzorg.

b — Nest von *Crematogaster* (*Acrocoelia*) *ferrarii* Em. Tjiampea bei Buitenzorg. Längsdurchmesser 15 cm.

c — Nest von *Polyrhachis* (*Aulacomyrma*) *mystica* Karaw. von aussen. Buitenzorg. Längsdurchmesser 7,5 cm.

d — Dasselbe Nest von der Innenseite.

e — Nest von *Myrmicaria arachnoides* Sm. Buitenzorg. Längsdurchmesser 12 cm.

f — Ein anderes Nest derselben Art, vom Blatt abgetrennt und von innen betrachtet.



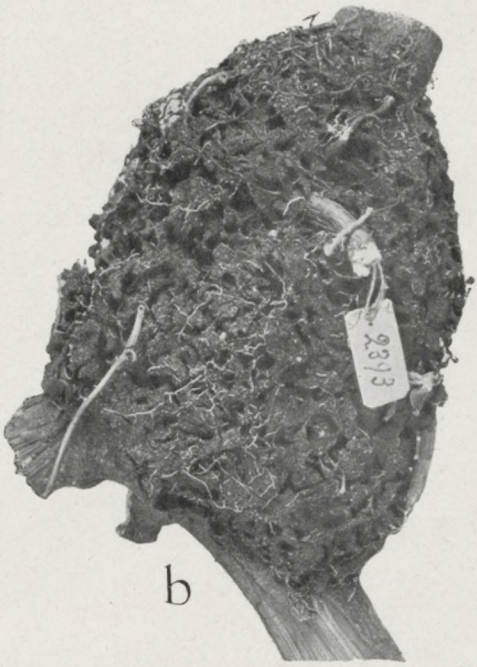










Photo: W. Karawajew.

W. KARAWAJEW: Neue Ameisen aus dem indo-australischen Gebiet.

NEW RECORDS AND SPECIES OF *MEMBRACIDAE* IN THE BUITENZORG MUSEUM COLLECTION.

By

W. D. FUNKHOUSER

(University of Kentucky, U.S.A.).

Through the courtesy of Mr. M. A. LIEFTINCK, Entomologist of the Zoological Museum of Buitenzorg, Java, and of Dr. L. G. E. KALSHOVEN, Forest Entomologist of Buitenzorg, I have been permitted to study a very interesting collection of *Membracidae,* one lot belonging to the Museum and another lot collected by Dr. KALSHOVEN, mostly in the teak forests of Mid Java.

All specimens have been deposited in the Buitenzorg Museum collection.

The material is particularly interesting not only because it represents forty-four species of which seven are new, but because it contains data on the habitats, hosts and food plants for a number of the species. This information is extremely valuable because of the fact that very little is known of the biology or life histories of the *Membracidae* of the East Indies and the recording of such data is a distinct contribution to the knowledge of the subject.

I am indebted not only to Mr. LIEFTINCK and to Dr. KALSHOVEN for the opportunity of examining this material but also to Dr. K. W. DAMMERMAN for the courtesies extended to me on the occasion of my visit to Buitenzorg in December 1932.

The material in the Buitenzorg Museum collection includes the following species, the localities for most of which are new and represent a welcome addition to the distribution records:

1. Leptocentrus vicarius WALKER.

A long series of 133 specimens in the Buitenzorg Museum collection from Doerian I., Riouw Archipelago, from West Sumatra (Padangsche Bovenlanden), and from various localities in West Java.

Both sexes are well represented. Apparently this is one of the commonest species of *Membracidae* in the Archipelagic region as we have received it from a large number of localities in Sumatra, Borneo, Java, Malaya and South India. Dr. KALSHOVEN reports that he has collected this species on the inflorescence of teak (*Tectona grandis*).

2. Leptocentrus leucaspis WALKER.

A single specimen in the Buitenzorg Museum collection, taken by Dr. DAMMERMAN in Northeast Soemba, Kambera, in March 1925.

3. Leptocentrus obortus DISTANT.

Three specimens in the Buitenzorg Museum collection from Sarolangoen, collected in July by Dr. O. POSTHUMUS during the Djambi Expedition (Sumatra) of 1925.

4. Leptocentrus longispinus DISTANT.

A single specimen in the Buitenzorg Museum collection from Wailima, Lampongsche Districten, South Sumatra, taken by H. H. KARNY & H. C. SIEBERS, in November 1921.

5. Leptobelus dama GERMAR.

A fine series of twenty-two specimens in the Buitenzorg Museum collection, including representatives of both sexes, and four specimens from Dr. KALSHOVEN's collection. Both the Buitenzorg material and Dr. KALSHOVEN's specimens are from various parts of Java. Java is the type locality for the species. Although the species is apparently abundant and well distributed throughout the island, nothing is known of its host or food plants.

6. Hypsauchenia recurva FUNKHOUSER.

A long series of forty-two specimens, with both sexes represented, in the Buitenzorg Museum collection and six specimens in Dr. KALSHOVEN's collection. The specimens in the Buitenzorg collection represent material from both West Sumatra (Padangsche Bovenlanden) and West Java (Mt. Salak, Tjibodas on Mt. Gedeh, and Soekanegara, Priangan) at altitudes varying between 800 and 1450 meters. This species was described from Java and must be quite common in the East Indies. The material includes several nymphs of the species [1]), collected in the mountain-garden at Tjibodas by Mr. LIEFTINCK. These are the first immature forms of *recurva* which the writer has seen. The species has not been mentioned in the literature of the *Membracidae* since the publication of the original description.

7. Gigantorhabdus enderleini SCHMIDT.

Five adults and five nymphs of this very rare and bizarre membracid in the Buitenzorg Museum collection, all collected by H. C. SIEBERS during the Central East Borneo Expedition, on September 25, 1925 [2]). The nymphs have never

[1]) At Tjibodas I have frequently watched small colonies of this Membracid on the end-shoots of a small tree of *Talauma candollei* (L.), an indigenous *Magnoliacea* cultivated in the garden. Both imagines and larvae were found on this tree at any time of the year, the larvae being assiduously attended by ants (*Myrmicaria brunnea subcarinata* SM.) for the sake of a sweet secretion emitted from the extremity of their body. A colony of *Hybandoides sumatrensis* FUNKH., also found at Tjibodas, but the host-plant of which has remained unknown to me, was being tended by the same species of ant. — M. A. LIEFTINCK.

[2]) A description and drawing of this fine insect are to be found in H. C. SIEBERS' itinerary of the „Midden-Oost-Borneo-Expeditie 1925", published by the trustees of the Indisch Comité voor wetenschappelijke onderzoekingen (Weltevreden, G. Kolff & Co., 1927; p. 359-360, fig. 12). Mr. SIEBERS reports that this curious Membracid was only once found by him feeding on the very young shoots of a shrub near Long Petah, Telen River, at about 450 meters above sea-level. — M. A. L.

before been reported and the species has not been mentioned in the literature of the family since its original description in 1906. It is one of the largest and most grotesque of all *Membracidae*. It was described from North Borneo and has never been reported from any other region.

8. Hybandoides sumatrensis FUNKHOUSER.

A series of nineteen adults and eleven nymphs in the Buitenzorg Museum collection, all taken in the mountain garden of Tjibodas, at Mt. Gedeh, in West Java, at a height of 1450 meters, in August 1931 by M. A. LIEFTINCK and four specimens in Dr. KALSHOVEN's collection secured also at Mount Gedeh, at an elevation of 1000 meters, in September 1923. The specimens collected by Dr. KALSHOVEN were found feeding on the shoots of various trees but the specific host plants are not indicated. For this species also we have the first record since its original description and the first immature forms which the writer has seen.

9. Micreune formidenda WALKER.

A single specimen in the Buitenzorg Museum collection. This specimen is a well marked female collected in Central East Borneo by H. C. SIEBERS, on November 13, 1925. This species was originally described from Borneo but has been found also in other parts of the Malayan and East Indian region.

10. Anchon ulniforme BUCKTON.

Four specimens in Dr. KALSHOVEN's collection, three collected in the teak forest at Semarang, Java by Dr. KALSHOVEN and one from the same locality taken by FR. A. TH. H. VERBEEK. According to Dr. KALSHOVEN's notes, this species is found on the shoots of *Butea frondosa*. This is the first record which has been published concerning the host plant of this species.

11. Maguva sinuata sp. nov. (fig. 1).

Large, brown, pubescent; suprahumerals flattened and truncate; posterior process strongly sinuate, extending to internal angles of tegmina; tegmina opaque with brown markings.



Fig. 1. — *Maguva sinuata*, sp. n.

Head subtriangular, brown, densely pilose; base high and sinuate; eyes large, gray; ocelli large, prominent, amber, farther from each other than from the eyes and situated about on a line drawn through centers of eyes; inferior margins of genae lobed; clypeus broad, flat, truncate.

Pronotum brown, densely pubescent; metopidium sloping; median carina strong, percurrent; humeral angles prominent, triangular; suprahumeral horns broad, flattened dorso-ventrally, as long as the distance between their bases, tips truncate with three slight lobes, projecting outward and slightly upward;

posterior process touching tip of scutellum, strongly sinuate with two elevations, tip sharp and reaching internal angles of tegmina; scutellum broad, triangular, base convex, tip bidentate.

Tegmina pointed; no limbus; opaque with irregular dark brown splotches; veins strong, brown; base brown, coriaceous, pubescent; five apical and two discoidal cells.

Undersurface of body brown, pubescent; legs brown; tarsi very dark brown.

Length from front of head to tips of tegmina 8 mm; width between tips of suprahumerals 4.5 mm.

Type: female.

Locality: Buitenzorg, West Java.

Described from a single specimen collected by L. G. E. KALSHOVEN on May 25, 1925. Type in the Buitenzorg Museum collection.

12. Sarritor retusus DISTANT.

Six specimens of this representative of the very remarkable genus in Dr. KALSHOVEN's collection, all taken in the teak forest at Semarang, Java, over a series of years from 1922 to 1931. The host plant of the species, as recorded by Dr. KALSHOVEN, is *Gossampinus heptaphylla*, on the shoots of which the specimens were found.

13. Dingkana borealis GODING.

One specimen in the Buitenzorg Museum collection from New Guinea, collected by TER POORTEN.

14. Sertorius areolatus GODING.

A single slightly mutilated specimen in the Buitenzorg Museum collection from North New Guinea, Albatros-Bivak on the Mamberamo River, collected by W. M. DOCTERS VAN LEEUWEN, in March 1926.

15. Telingana paria FAIRMAIRE.

Two females in the Buitenzorg Museum collection from the coral-island Zuid Wachter in the Java Sea, collected on October 22, 1921.

This is one of the commonest species of the genus and has been reported from many localities in India and the East Indies.

16. Telingana flavipes KIRBY.

A single specimen in the Buitenzorg Museum collection, taken by Dr. K. W. DAMMERMAN at Doerian I., Riouw-Archipelago, in June 1923. Another common species of the genus *Telingana*, well distributed throughout the Indian and Archipelagic region.

17. Telingana depressa sp. nov. (fig. 2).

Long, narrow, purplish-brown, punctate, pubescent; suprahumeral horns short, depressed; posterior process slender, straight, extending beyond internal

angles of tegmina; scutellum and undersurface of thorax densely white tomentose.

Head subquadrate, dark purplish-brown, roughly sculptured, finely punctate, sparingly pubescent; base strongly arcuate; eyes large, prominent, brown; ocelli large, glassy, equidistant from each other and from the eyes and situated a little above a line drawn through centers of eyes; inferior margins of genae strongly lobed; clypeus large, triangular, tip pointed.

Pronotum dark purplish-brown, finely punctate, sparingly pubescent; metopidium convex, strong percurrent median carina; humeral angles large, prominent, extending outward farther than the eyes; suprahumeral horns short, triquerate, as long as the distance between their bases, extending outward and very slightly upward, tips sharp; posterior process long, slender, nearly straight, not touching scutellum, extending to a point about halfway between internal angles of tegmina and tip of abdomen; scutellum entirely exposed, long, triangular, pubescent, tip dentate.

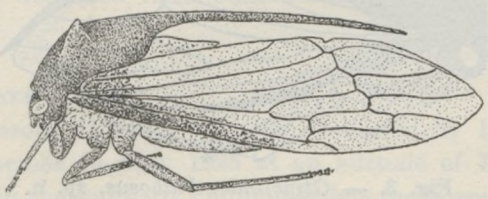


Fig. 2. — *Telingana depressa*, sp. n.

Tegmina long, narrow, smoky-hyaline, very narrow limbus; base and costal margins coriaceous, black, punctate and pubescent; veins strong and brown; five apical and two discoidal cells.

Undersurface of body brown; sides of thorax densely tomentose; femora brown; tibiae flavous-brown; tarsi dark brown.

Length from front of head to tips of tegmina 8 mm; width between tips of suprahumerals 3.5 mm.

Type: female.

Locality: West Java, Mt. Gedeh, Tjibodas, 1450 m, August 31, 1931, M. A. Lieftinck.

Described from a single specimen. Type in Buitenzorg Museum collection.

18. Otinotoides strigatus Walker.

One specimen in the Buitenzorg Museum collection collected in North New Guinea, Rouffaer River, in August 1920, by W. M. Docters van Leeuwen.

19. Otinotoides intermedius Distant.

A single typical female of this species in the Buitenzorg Museum collection taken by H. C. Siebers near Toeal, Kei Islands, in 1922 (no. 55).

20. Otinotoides semilucidus Walker.

Four specimens, all females, all collected in North New Guinea by W. C. van Heurn in 1920. Three of the specimens are from Pionierbivak, January 1920, and one from Prauwenbivak. This is one of the largest and most distinctly marked species of the genus.

21. Otinotoides bulbosus sp. nov. (fig. 3).

Large, shining, purplish-black, punctate, not pubescent; suprahumeral horns short, sharp, pointing directly outwards; posterior process long, slender, decurved, touching scutellum and tegmina, with a bulbous swelling at base; legs bright orange.

Head subquadrate, shining, purplish-black, smooth; base arcuate; eyes large, prominent, light yellow; ocelli conspicuous, pearly, equidistant from each other and from the eyes and situated well above a line drawn through centers of eyes; inferior margins of genae sinuate; clypeus short, tip rounded.

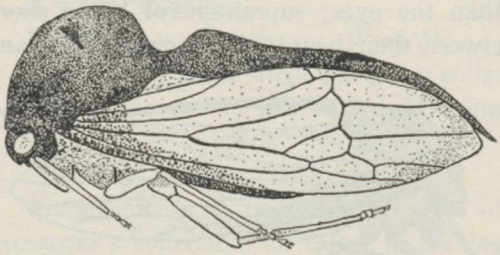


Fig. 3. — *Otinotoides bulbosus*, sp. n.

Pronotum shining, purplish-black, coarsely punctate, not pubescent; humeral angles small, obtuse; metopidium convex; median carina obsolete; suprahumeral horns short, slender, sharp, projecting directly outwards; posterior process long, slender, decurved, touching scutellum and tegmina for its entire length, extending just beyond tips of tegmina, base strongly swollen; scutellum partially exposed, white tomentose.

Tegmina bronze-hyaline, base and costal margin purple, coriaceous, punctate; tip clouded with brown; five apical and two discoidal cells.

Undersurface of body purplish-black, densely pubescent; legs bright orange.

Length from front of head to tips of tegmina 8.5 mm; width between tips of suprahumerals 5 mm.

Type: female.

Locality: New Guinea.

Described from a single specimen collected by W. M. DOCTERS VAN LEEUWEN, on Rouffaer River, 175 m, in North New Guinea, August 1926.

The shining purplish pronotum and bright orange legs of this species make it particularly conspicuous and easily recognized. Type in Buitenzorg Museum collection.

22. Ebhul varius WALKER.

Three specimens in the Buitenzorg Museum collection, two of which are collected by Mr. LIEFTINCK at Tjisaroea, Mt. Panggerango-Gedeh, W. Java at an altitude of 1000 meters on December 13, 1930, and one taken by the same collector at Mt. Salak (Goenoeng Boender), 800 m, on April 6, 1931.

This species was originally described from Burma but is abundant throughout the Malay Peninsula and has been reported from Borneo and Sumatra as well as from Java.

23. Sipylus dilatatus WALKER.

Three specimens in the Buitenzorg Museum collection, all taken in Djambi, South Sumatra, by Dr. O. POSTHUMUS, on July 2, 1925 and five specimens in

Dr. KALSHOVEN's collection from the teak forest at Semarang, Mid Java, collected in May 1931. Dr. KALSHOVEN reports that his specimens were found on the inflorescence of teak. This species shows considerable variation throughout its oriental distribution, particularly as regards the pronotal protuberances, but we can find no specific differences in other respects.

24. Tricentrus nigroapicalis FUNKHOUSER.

Two specimens in the Buitenzorg Museum collection, both collected by Dr. DAMMERMAN at Doerian I., Riouw Archipelago, in November 1923 and four specimens in Dr. KALSHOVEN's collection, all taken in the teak forest at Rembang, Java on May 3, 1925. Dr. KALSHOVEN collected his specimens on the shoots of *Acacia tomentosa*. This species was described from Sumatra and this is the first record from Java.

25. Tricentrus brunneicornis FUNKHOUSER.

A single specimen in the Buitenzorg Museum collection, collected by Dr. DAMMERMAN at Kananggar, East Soemba in May 1925 at an altitude of 700 meters. This is a species first found in the southern Philippines but the Soemba specimen entirely agrees with the type.

26. Tricentrus spinidorsus FUNKHOUSER.

Four specimens in the Buitenzorg Museum collection, representing two different localities in South Sumatra, viz.: Sarolangoen (Djambi) and Wailima (Lampongsche Distr.), and two in West Java, viz.: Tjisaroea and Tjibodas at Mt. Gedeh. All are typical examples of the species.

27. Tricentrus rufipennis sp. nov. (fig. 4).

Large, black, punctate, pubescent; suprahumerals small, triquerate; posterior process heavy, tectiform, reaching just beyond internal angles of tegmina; tegmina distinctly reddish-brown, translucent.

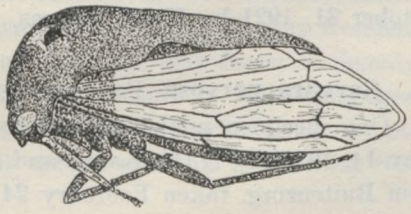


Fig. 4. — *Tricentrus rufipennis*, sp. n.

Head subquadrate, much wider than long, black, finely punctate, pubescent with short golden hairs; base arcuate; eyes large, reddish-brown; ocelli small, inconspicuous, brown, equidistant from each other and from the eyes and situated slightly above a line drawn through centers of eyes; inferior margins of genae nearly straight; clypeus diamond-shaped, extending for half its length below inferior margins of genae, tip acute, pilose.

Prothorax black, finely punctate, sparingly pubescent; metopidium slightly convex, broader than high; median carina percurrent; humeral angles blunt; suprahumeral horns small, triquerate, not as long as half the distance between

their bases, extending outwards and slightly upwards, tips sharp; posterior process heavy, tectiform, decurved, tip blunt and extending just beyond internal angles of tegmina; scutellum well exposed.

Tegmina wrinkled, semi-opaque, bright reddish-brown; base narrowly black, coriaceous and punctate; five apical and two discoidal cells; limbus very narrow.

Legs and undersurface of body black; hind trochanters armed with spines.

Length from front of head to tips of tegmina 7 mm; width between tips of suprahumerals 4,4 mm.

Type: female.

Locality: Central East Borneo, No. 210, November 27, 1925. Collector: H. C. SIEBERS.

Described from a single specimen. Type in the Buitenzorg Museum collection.

28. Gargara varicolor STÅL.

A single specimen in the Buitenzorg Museum collection, collected at Depok on April 5, 1924, by H. H. KARNY.

29. Gargara nitidipennis FUNKHOUSER.

Three specimens in the Buitenzorg Museum collection, all collected by Dr. DAMMERMAN at Doerian I., Riouw Archipelago, in June 1923.

30. Gargara mixta BUCKTON.

One specimen in the Buitenzorg Museum collection from Doerian I., Riouw Archipelago, collected by Dr. DAMMERMAN in November 1923.

31. Gargara minuta FUNKHOUSER.

A specimen in the Buitenzorg Museum collection, taken at Buitenzorg on October 31, 1921 by H. C. SIEBERS.

32. Gargara nervosa FUNKHOUSER.

One specimen in the Buitenzorg Museum collection from Depok, collected May 14, 1929, by H. H. KARNY and one specimen in Dr. KALSHOVEN's collection from Buitenzorg, taken February 24, 1925.

33. Gargara sordida FUNKHOUSER.

One specimen in the Buitenzorg Museum collection from West Sumatra, Loeboeksikaping, 450 m, 1923-26, collected by L. HUNDESHAGEN, and seven specimens in Dr. KALSHOVEN's collection, all from the teak forests of Java. All but one of Dr. KALSHOVEN's specimens were taken on the shoots of *Dalbergia latifolia* which gives us the first information we have ever had regarding the food plant of this species.

34. Gargara flavocarinata Funkhouser.

Four specimens in the Buitenzorg Museum collection, all collected in West Sumatra, Loeboeksikaping, ca 450 m, by L. Hundeshagen in 1923-1927, and three specimens in Dr. Kalshoven's collection from the teak forest at Semarang, Java, collected in 1930-31. Dr. Kalshoven's specimens were taken on the inflorescence of *Tectona*. This species was described from Sumatra but its food plant has hitherto been unknown.

35. Gargara rubrogranulata Bierman.

Fifteen specimens, all from the teak forest of Semarang, Java. One series of ten was collected by Dr. Kalshoven on November 30, 1922; one was taken on February 22, 1925 and the others on March 10, 1931. This is a very decorative little species and is apparently abundant in the East Indies. Dr. Kalshoven reports that the host is *Butea frondosa* as indicated by the presence of the insects on the shoots, which again is the first record of the food plant of this species.

36. Gargara citrea Distant.

Two specimens, both females, from Rembang, near Tjepoe, July 23, 1925, collected by F. Verbeek. No data are available regarding the habitat or host of this species which was originally described from India but has a wide distribution in the Archipelago.

37. Gargara projecta Funkhouser.

One specimen in Dr. Kalshoven's collection, now in the Buitenzorg Museum, with the same data as the preceding. Dr. Kalshoven states that he has no notes on its food plant.

38. Gargara brunneidorsata Funkhouser.

Four specimens in the collection of Dr. Kalshoven: two females taken at Rembang on January 10, 1931; one male captured at Paree (Kediri Residency, East Java) on October 20, 1924 and a female from the teak forest at Semarang found on July 12, 1925. All collected on the inflorescence of teak. This species was originally described from Java and has never been reported from any other region. We have never seen nymphs of this species and this is the first record of its food plant.

39. Gargara triangulata Funkhouser.

Four specimens, all females, from Dr. Kalshoven's collection, all collected in the teak forest in Semarang, Java on January 10, 1931. According to Dr. Kalshoven's notes, these specimens were taken on shoots of *Vitex pubescens*. We described this species in 1918 from material collected near Singapore and in Penang but have not seen other specimens since that time. The record of its food plant is new.

40. Gargara granulata FUNKHOUSER.

One specimen, a characteristically marked male, collected by Dr. KALSHOVEN on March 10, 1931 in the teak forest of Semarang, Mid Java, on the inflorescence of *Vitex pubescens* and now in the Buitenzorg Museum collection. This is a new locality record and the first record of the food plant of the species.

41. Gargara pilinervosa FUNKHOUSER.

A single male collected by Dr. KALSHOVEN, on the shoots of *Butea frondosa* in the teak forest at Semarang, Java on November 30, 1922. This species was described from Borneo but Dr. KALSHOVEN's specimen is entirely typical. The species has not been mentioned in the literature of the family since its original description fourteen years ago and this is the first record of it host, habitat or food plant.

42. Gargara setosa sp. nov. (fig. 5).

Slender, black, punctate, densely pilose; posterior process reaching internal angles of tegmina; tegmina smoky hyaline with a brown transverse band across middle; legs and undersurface black.



Fig. 5. — *Gargara setosa*, sp. n.

Head subquadrangular, twice as broad as high; finely punctate, densely pubescent with long golden hairs; base arcuate and feebly sinuate; eyes large, light brown; ocelli small, glassy, inconspicuous, equidistant from each other and from the eyes and situated slightly above a line drawn through centers of eyes; clypeus triangular, projecting for half its length below inferior margins of genae.

Prothorax black, densely pilose, finely punctate; metopidium convex, somewhat broader than high; median carina percurrent; humeral angles large, prominent, triangular; posterior process slender, straight, tip very acute, extending just to internal angles of tegmina; scutellum pilose, narrowly exposed.

Tegmina smoky hyaline with a broad transverse brown band across middle; base narrowly black, coriaceous, punctate, pubescent; five apical and two discoidal cells.

Undersurface of body black; femora black; tibiae and tarsi dark brown, pilose.

Length from front of head to tips of tegmina 5.3 mm; width between humeral angles 2.5 mm.

Type: female.

Locality: Boeroe I., Moluccas (Station 5, 1921, and Fakal, November 1921). Collector: L. J. TOXOPEUS.

Described from three specimens, two females and one male, all taken at the type locality. Type and allotype in Buitenzorg Museum collection; paratype in author's collection.

43. Gargara carinata sp. nov. (fig. 6).

Small, black, compact, punctate; eyes white; tegmina black; median carina very high and sharp both on pronotum and posterior process.

Head black, punctate, wider than high; base sinuate; eyes large, white; ocelli white, conspicuous, twice as far from each other as from the eyes and situated about on a line drawn through centers of eyes; clypeus broad, extending for half its length below inferior margins of genae.



Fig. 6. — *Gargara carinata*, sp. n.

Pronotum black, finely punctate, not pubescent; metopidium sloping, broader than high; humeral angles strong, triangular, blunt; median carina percurrent, very high and sharp on both metopidium and posterior process; posterior process heavy, tectiform, extending just to internal angles of tegmina; scutellum narrowly exposed.

Tegmina entirely black, opaque; tip rounded; base coriaceous and punctate; five apical and two discoidal cells; limbus very narrow.

Legs and undersurface of body entirely black.

Length from front of head to tips of tegmina 3 mm; width between humeral angles 1.8 mm.

Type: female.

Locality: Semarang, Mid Java.

Described from three specimens, all females, taken in a teak forest in the type locality on January 23-24, 1931. According to Dr. KALSHOVEN's field notes these specimens were taken on the inflorescence of teak, „djati", *Tectona grandis*. Type and one paratype in the Buitenzorg Museum collection; one paratype in author's collection.

44. Gargara pulchella sp. nov. (fig. 7).

Small, pronotum black; eyes white; tegmina shining hyaline with black base; snowy white tomentose line on sides of thorax and under base of tegmina; legs ferruginous.



Fig. 7. — *Gargara pulchella*, sp. n.

Head black, very finely punctate, not pubescent; twice as broad as long; base arcuate and feebly sinuate; eyes white; ocelli small, glassy, inconspicuous, twice as far from each other as from the eyes and situated well above a line drawn through centers of eyes; clypeus triangular, extending for half its length below inferior margins of genae.

Pronotum black, finely punctate, shining, not pubescent; humeral angles strong, triangular, blunt; metopidium sloping, broader than high; median carina obsolete over metopidium but well accentuated on posterior process; posterior process short, heavy, tectiform, tip blunt and just reaching internal angles of tegmina; scutellum well exposed.

Tegmina hyaline, shining; base narrowly black and punctate; white tomentose patch of thorax showing through basal hyaline region; veins white, inconspicuous, slightly pilose; limbus broad; five apical and two discoidal cells.

Sides of thorax black with snowy white tomentose line; legs ferruginous.

Length from front of head to tips of tegmina 2.8 mm; width between humeral angles 1.7 mm.

Type: female.

Locality: Semarang, Mid Java.

Described from seven specimens, five females and two males, all collected by L. G. E. KALSHOVEN on the inflorescence of teak in the teak forest at Semarang, Java, in March 1931. Type, allotype and three paratypes in the Buitenzorg Museum collection; two paratypes in author's collection. An extremely decorative little species.

SOME NEW OR RARE FISHES OF THE INDO-AUSTRALIAN ARCHIPELAGO IV [1].

By

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Fam. **NARCACIONTIDAE.**

NARCINE HENLE.

Narcine timlei (SCHNEIDER).

Disk subcircular, somewhat more broad than long, its length a little shorter than half of total length of animal. Anterior nasal valves short, united into a broad flap, with three slight notches, reaching to mouth, sparsely ciliated. Posterior valves short continued in a fold towards angle of mouth. Mouth small, protactile. Bands of teeth narrow, folded outwards in lower as well as in upper jaw. Each teeth with a sharp point on innerside of the crown. These points are not found on those parts of the bands which are bent outwards. Eyes small. Spiracles large, close behind eyes. Walls of spiracles smooth. Dorsals subequal, their height about equal to the distance between the spiracles. First dorsal situated behind the insertion of the ventrals. Ventrals with an almost straight hindborder. Height of caudal about 1½ in its length. A horizontal fold of skin on each side of tail, beginning behind first dorsal and ending before caudal. Colour reddish brown with darker spots.

One specimen (male) with a total length of 25 cm I received from Bagan si Api Api (Sumatra). Furthermore I got two specimens (females) from Batavia. The teeth of the latter individuals were not so pointed as those of the Sumatran specimen. With one of the females the spot on the back were more numerous and smaller.

Literature consulted:

1. *Narcine timlei* BLEEKER, Natuurkundig Tijdschr. Ned. Indië, 1853, p. 512.
2. *Narcine timlei* GARMAN, Memoirs of the Museum of Comp. Zoöl. Harvard Vol. XXXVI, 1913, p. 300.

Fam. **SILURIDAE.**

HEMISILURUS BLKR.

Hemisilurus heterorhynchus (BLKR.).

B.11; A.93; P.I.5; V.9.

[1] Cf. Treubia, XIII, p. 411; XIV, p. 215; XIV, p. 287.

Height 4, head 5.2 in length [1]). Eye subcutaneous, 6.6 in head, situated in anterior part. Snout prominent, rounded, 3.3 in head. Anterior nostrils short tubes at top of snout. Posterior nostrils not ending in short tubes, situated far behind and above eye. Maxillary barbels slender, reaching to frontborder of eye, flexible. Mandibulary barbels very small about as long as half eye, situated far backwards from symphysis somewhat before the hyoid bone. The distance between these barbels is somewhat less than 1½ eye. Anal distinctly free from caudal, its length about $^5/_8$ of head and body, foremost rays somewhat shorter than following ones. Ventrals reaching to third anal ray, about as long as longest anal ray. Pectorals reaching to vertical through 8th anal ray, shorter than head. Its osseous spine longer than half of head. Caudal deeply incised, with rounded lobes. Fine curved teeth in curved bands on jaws. Two small rounded patches on vomer, covered partly by the velum. 10 gillrakers. Body grayish to brownish darker above. Head with yellowish patches. Fins darkish.

One specimen from the mouth of the Rokan River (Bagan si Api Api, Sumatra) with a total length of 45.5 cm. Native name "ikan adang budak".

Literature:

1. *Wallago heterorhynchus* BLEEKER, Nat. Tijdschr. Ned. Ind. V, 1853, p. 514.
2. *Hemisilurus heterorhynchus* BLEEKER, Atl. Ichth. II, 1862, p. 94.
3. *Hemisilurus heterorhynchus* GÜNTHER, Cat. Brit. Mus. II, 1864, p. 54.
4. *Hemisilurus heterorhynchus* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago Vol. II, 1913, pag. 211.

Hemisilurus scleronema BLKR.

B.10; A.111; P.I.16; V.9.

Heigth 5.1. Head 6.3 in length. Eyes subcutaneous, 6.0. in head. Length of snout about twice in postorbital part of head. Snout obtuse rounded, prominent. Anterior nostrils ending in short tubes, situated on top of snout, not far distant from each other. Posterior nostrils not tubular, above frontborder of eye. Maxillary barbels stiff, hooked posteriorly, short, broadly compressed at their base. Mandibulary barbels besides the anterior end of the hyoid bone, very small, almost invisible. Anal ceases before caudal, its longest rays about 3 in head. Ventrals reaching to fifth anal ray, its length about 4 in height of body. Pectorals reaching to 8th anal ray, its length as long as head without snout. The spine somewhat shorter than postorbital part of head. Fine villiform teeth in bands on jaws. Two small patches of teeth on vomer. Body grayish, darker above. Caudal fin powdered with dark, especially at its border, as is the case in the anal.

One specimen with a total length of 46 cm from the mouth of the Rokan-River, Bagan si Api Api, Sumatra. Native name: Ikan kumu.

Literature:

1. *Hemisilurus scleronema* BLEEKER, Atl. Ichth. II 1862, p. 93.

[1]) With lengths is always meant the length of head and body without the caudal fin.

2. *Hemisilurus scleronema* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago II 1913, p. 214.

Hemisilurus moolenburghi WEBER and DE BEAUFORT.

B.11-12; A.97; P.I.15; V.9.

Height 5.2, head 5.1 in length. Eyes subcutaneous, situated in anterior half of head, 10.3 in head, 3.8 in snout, about 5 in the convexity of interorbital space. Snout about ⅔ of postorbital part of head, rounded, prominent. Mouth-opening inferior, transverse. Dorsal profile ascending from snout to the convex back with a slight concavity. Highest point of body just behind ventrals. Anterior nostrils tubular, at top of snout. Posterior nostrils situated above and behind eye, bordered by a superior and inferior lip. Maxillary barbels situated laterally and behind anterior nostrils, originating from a rounded base, stiff in the proximal part, distally flexible and setaceous, reaching the anterior border of the opercle. Mandibulary barbels far distant from symphysis very slender, about as long as pupil. Anal not united with caudal, the latter deeply forked. Its lobes slender and pointed, much shorter than head. Ventrals reaching to second anal ray, 3.6 in head. Pectorals reaching not so far backwards, 1.3 in head. Teeth in upper jaw in two broad and curved patches. The bands in the lower jaw are more curved and narrowing laterally. Vomerine teeth in two small oval patches. All teeth villiform; 14 short gillrakers. Colour greyish or blueish, lighter below. All fins more or less blackish.

One specimen (male) with a total length of about 31 cm, found in the fishmarket of Pontianak (Borneo) in December 1930 by Mr. COOMANS DE RUITER. It differs from the type-description from WEBER and DE BEAUFORT in having a somewhat smaller eye. Otherwise my specimen is quite identical.

Literature:

1. *Hemisilurus moolenburghi* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago II, 1913, p. 212.

Fam. **ARIIDAE.**

ARIUS C.V.

Arius leptonotacanthus BLKR.

B.4; D.I.7; A.20; P.I.11; V.6.

Elongate. Height 4.4 in length. Head 3.4 rather broad than high, its greatest width 1.2 in its length. Shields of head scattered with very fine granulations. The long broad median fontanel reaches to base of the triangular occipital process, which is more shorter than broad, carinated in the middle. Its broad and somewhat emarginated hindborder reaches to the smooth and small basal bone of the dorsal spine. Eyes lateral, with a free orbital margin, 6.2 in head, 2.2 in snout. Snout prominent. Mouth large, transverse. Teeth villiform, in one curved band in upper and in two curved bands in lower jaw. Teeth on vomer in two elongated, pearshaped patches, slightly converging posteriorly. Three

pairs of barbels, which are all broad and flattened. Maxillary ones reaching to beyond gillopening, mental ones reaching just to gillopening. Maxillary barbels lying partly in a groove below the eyes. Dorsal spine serrated on posterior and anterior side, 1.5 in head. Pectoral spine also serrated on both sides, 1.6 in head, slightly curved. Axillary pore present. Adipose fin with a rounded border, about equally long and high. Anal somewhat emarginated, its longest ray 1.6 in head. Ventrals about twice in head. Caudal with equal and broad obtuse lobes. Blueish above, whitish below. All fins blackish, only the ventrals entirely white. Outer side of maxillary barbels powdered with black.

One specimen with a total length of 128 mm from the mouth of the Djambi-river (Sumatra) May 1934.

Literature:

1. *Arius leptonotacanthus* BLEEKER, Verh. Bat. Gen. XXII, 1849, Bijdr. Ichth. Madura, p. 11.
2. *Arius leptonotacanthus* BLEEKER, Atlas Ichth. II, 1862, p. 32.

Fam. **SYNGNATHIDAE.**

ICHTHYOCAMPUS KAMP.

Ichthyocampus carce HAM. BUCH.

D.26; A.2; P.13; C.9; Rings 15 + 41. Subdorsal rings from the 2nd to the 9th tail ring.

Body somewhat compressed, heptagonal. Abdominal cristae sharp and prominent. Tail tetragonal, with a transverse section which is more high than broad. Tail about 2½ as long as trunk. Shields with prominent, crenulated edges, transversely striated with a seallike figure in their anterior part. Inferior cristae of trunk and tail continuous. Median cristae of trunk deflecting to inferior cristae, without coalescing with them. Head 8 in length. A median ridge on snout. Eye 7.5 in head, more than 3 in snout which is subequal to postorbital part of head. Operculum with two longitudinal keels, the lower one median and the upper one placed on the upper part of the operculum. From the median keel rugosities are radiating. A keel above the eyes, which is deflecting to the median keel on the snout but not coalescing with it. On the sides of the snout three keels are found of which the upper one is more or less deflecting with a keel below the eyes. Colour brownish, with white spots on each trunk ring on the inferior cristae.

One specimen with a total length of 11.5 cm. Batavia, October 1933.

Literature:

1. *Syngnathus carce* HAMILTON BUCHANAN, Fishes of the Ganges, 1822, p. 13.
2. *Hippichthys heptagonus* BLEEKER, Verh. Bat. Genootsch. XXII, 1849, p. 15.
3. *Syngnathus carce* BLEEKER, Verh. Bat. Genootsch. XXV, 1853, p. 161.
4. *Syngnathus heptagonus* BLEEKER, Nat. Tijdschr. Ned. Ind. IX, 1855, p. 430.
5. *Ichthyocampus carce* GÜNTHER, Cat. Brit. Mus. VIII, 1870, p. 176.
6. *Ichthyocampus carce* DAY, Fishes of India, p. 679.

7. *Ichthyocampus carce* CHAUDHURI, Mem. Indian Museum V, 1916, p. 456.
8. *Ichthyocampus carce* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago IV, 1922, p. 92.

Fam. **POLYNEMIDAE.**

POLYNEMUS L.

Polynemus pfeifferi BLKR.

In Treubia Vol. XIV 1934, p. 293 I published a description of a specimen of *Polynemus pfeifferi* from Pelabuan Ratu (South Coast of Java). Since then I got some more specimen closely agreeing with the description mentioned above, through the courtesy of Mr. J. C. VAN DER MEER MOHR. These last specimens were caught near the coast of Medan (Strait Malacca).

Fam. **SOLEIDAE.**

TYPHLACHIRUS (HUBBS) HARDENBERG.

In Treubia Vol. XIII, 1931, I published the description of a blind sole, *Typhlachirus caecus* nov.gen.nov.spec. In this publication I omited to give a diagnosis of the genus, which now follows below:

Diagnosis of the genus *Typhlachirus:*

Rather small fishes, with an oval body, lying on their left side. Only one blind, more or less inconspicuous eye, situated near corner of mouth in upperlip. Head especially on blind side, densily covered with tentacles, which are also found on the lower side of the rays of dorsal and anal. Scales ctenoid on both sides, covered with skin. Anal, caudal and dorsal confluent. Right pectoral minute, almost absent, near upper corner of gillopening. Left pectoral short with a broad base. Right ventral connected with anal. Left ventral free. Occurring on soft muddish bottom in rivermouths.

Hitherto the single known species was only found by me in the mouth of the Rokan River (Sumatra). In May 1934 however I happened to find several individuals in the Banju-asin (mouth of the river Musi). These specimens agree closely with the description given in my above mentioned article.

Fam. **CARANGIDAE.**

CARANX LACÉPÈDE.

Caranx (Caranx) ignobilis (FORSK.).

D_1. VIII; D_2 I.19; A.II I.16; P.I.18; V.I.6.

Compressed. Height 2.5, head 2.9 in length. Dorsal profile strongly convex till first dorsal, thence slightly convex till caudal peduncle. Ventral profile straight till anal. Eye 4.5 in head, with a narrow posterior adipose eyelid, situated in the anterior half of head, for the greater part above longitudinal axis of

body, about as long as snout. Cleft of mouth about one eyediameter below eye. Jaws subequal. Maxillary reaches to beyond centre of eye. Teeth villiform with an outer row of irregularly placed canines. Villiform teeth on vomer, palatines and tongue. 13 Gillrakers on lower branch of gillarch. Breast naked till somewhat above ventrals, small patch of scales in front of ventrals. On the head scales are present on the cheeks, behind the eyes and on upper part of operculum. Otherwise the head is naked. Anterior part of lateral line moderately arched, becoming straight below seventh soft dorsal ray. Arched portion somewhat shorter than straight part, which bears 28 armed scutes. Third dorsal spine longest, about as long as snout and half diameter of eye. Soft dorsal and anal with an elevated and somewhat falcate lobe, their height, subequal, somewhat longer than postorbital part of head. Pectorals strongly falcate, reaching to 9th anal ray, about as long as height of body. Ventrals surpassing anus, about as long as postorbital part of head. Caudal deeply forked, lobes equal. Colour greenish above, silvery below. Dorsals and caudal with a blackish border, other fins hyaline.

One specimen with a total length of 34 cm from Pelabuan Ratu (Southcoast of Java), August 1933.

Literature:

1. *Scomber ignobilis* FORSKÅL, Descr. animal, 1755, p. 55.
2. *Caranx sansun* GÜNTHER, Cat. Brit. Mus. II, 1860, p. 447.
3. *Carangus hippoides* JENKINS, Bull. U.S. Fish. Comm. XXII, 1904, p. 443.
4. *Caranx ignobilis* JORDAN and EVERMANN, Bull. U.S. Fish. Comm. XXIII, 1905, p. 188.
5. *Caranx ignobilis* JORDAN and SEALE, Bull. Bur. of Fish. XXV, 1906, p. 231.
6. *Caranx ignobilis* JORDAN and RICHARDSON, Bull. Bur. of Fish. XXVII, 1908, p. 250.
7. *Caranx ignobilis* WEBER, Siboga Exp. Fishe, 1913, p. 398.
8. *Caranx ignobilis* WAKIYA, Ann. Carnegie Museum XV, 1924, p. 193.
9. *Caranx ignobilis* BARNARD, Ann. S. Afric. Museum, XXI, 1925-'27, p. 545.
10. *Caranx ignobilis* FOWLER, Fishes of Oceania. Memoirs Bishop Mus. X, 1928, p. 148.
11. *Caranx ignobilis* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago VI, 1931, p. 255.

SERIOLA CUVIER.

Seriola bonariensis C.V.

D.I (antrorse) + VII + I.30, A.II + I.20, P.22. V.I.5, L.l. ± 160.

Elongate. Depth about 3, head 3.7 in length. Eye 1.5 in snout, about 4.5 in head. Maxillary reaching a little behind frontborder of pupil, its greatest height about equal to eye. 19 gillrakers on lower branch of gillarch. Villiform teeth in bands on jaws. Patches of teeth present on vomer, palatines and tongue. Pectorals about twice in length of head. Ventrals somewhat longer than pectorals, inserted below their base. Anal thrice in length, dorsal more than twice.

Longest dorsal rays about as long as snout and eye, longest anal rays about as long as snout and half eye. Caudal forked with broad pointed lobes. Cheeks and upper part of operculum scaly. Body wholly covered with scales, those on forepart of body smaller than those on hindpart. Lateral line arched in forepart of body. Silvery-whitish below, blueish-dark above. A broad dark band from first rays of spinous dorsal through eye, down to praeorbital. Dorsal and caudal somewhat blackish, with a darker border. Anal slightly blackish with a whitish border. Pectorals hyaline. Ventrals darkish, outer rays excepted. Operculum blackish, shining through.

One specimen with a total length of 23 cm from the midst of the Java-Sea, captured with a hook. October 1933. Hithertho not found in the Indo-Australian Archipelago.

Literature:

1. *Seriola bonariensis* CUVIER and VALENCIENNES Hist. Nat. Poiss. Vol. IX, 1833, p. 211.
2. *Seriola bonariensis* GÜNTHER Cat. Brit. Mus. II 1860, p. 464.
3. *Seriola bonariensis* BARNARD, A Monograph of the Marine Fishes of South Africa, 1925-1927, p. 557.

Fam. **SCOMBRIDAE.**

GRAMMATORCYNUS GILL.

Grammatorcynus bilineatus (RÜPP.).

D^1 XII, D^2 I.10 + 7; A.II.9 + VII; P.I.21; V.I.5.

Oblong. Height 3.8, head 4.0 in length. Snout pointed, 2.9 in head. Eye large, 3.6 in head. Maxillary rather pointed posteriorly, reaching to below pupil. Jaws provided with a few small, caninelike, teeth. Patches of villiform teeth present to tongue, vomer and palatines. Unpaired fins rather low. Third dorsal spine longest, about 2.7 in height. Second dorsal and anal falciform and equal in height. Longest ray 3.0 in depth of body. Caudal deeply incised, lobes equal, their hindborder rounded. Pectorals 1.8, ventrals 3.1 in head. Scales, small and regular, present on whole body, also present on nape, opercles and cheeks. Two lateral lines. The uppermost one has a normal course from upper angle of operculum to caudal peduncle. The lowermost one branches off vertically downwards from the upper one at some distance behind the operculum, which is about equal to snout. The lower lateral line curves backwards below the level of the pectoral fin and unites again with the upper lateral line below the last but one finlet. Three low keels on caudal peduncle. Blueish above, silvery below, with irregularly scattered black spots on abdomen. All fins more or less blackish.

Very rarely found in the fishmarket of Batavia. All specimens were captured by Japanese fishermen on reefs in the western part of the Java-Sea. This description is made after a specimen with a total length of about 50 cm. Prof. Dr. L. F. DE BEAUFORT was so kind as to give me the name of this species.

Literature:

1. *Thynnus bilineatus* RÜPPELL, N.W. Fishe p. 39.
2. *Nesogrammus piersoni* EVERMANN and SEALE, Bull. of the Bureau of Fisheries XXVI, 1906, p. 61. It should be noted however that according to this description the eye should be much smaller, and indeed I do possess a specimen with a smaller eye. Furthermore the number of rays in the pectoral fin should be I.9 according to the description of JORDAN and SEALE. This is probably a misprint.
3. *Grammatorcynus bilineatus* KISHINOUYE, Journal Coll. of Agriculture Imp. Univ. Tokyo. Vol. VIII, 1923, p. 413.

Fam. **SERRANIDAE.**

PLECTROPOMA CUVIER.

Plectropoma oligacanthus BLKR.

D.VIII.11; A.III.7; P.I.14; V.I.5; L.1.121.

Oblong. Height 3.3, head 2.8 in length. Eye 7.5 in head entirely above level of snout. Lower jaw prominent, maxillary reaching to below pupil. Teeth in jaws small, a few big canines excepted. Praeoperculum with 5, not easily visible, spines. Nape, operculum and cheeks covered with scales of the same size as those on the body. L.1. irregularly arched. Spinous dorsal rather low, third spine longest, about 5 in head. Soft dorsal distinctly emarginated, its longest ray (the third one) about twice in head. Anal emarginated, about as high as soft dorsal, somewhat more high than long, its origin below third or fourth ray of dorsal. Caudal distinctly emarginated. Pectorals 2.2 in head, with a rounded hindborder. Ventrals somewhat longer than pectorals. Colour brownish red. Longitudinal, vermiculated blueish streaks on head, breast and forepart of back. A few blueish vertical lines on sides beginning above pectorals. More tailwards these lines pass gradually into vertical series of blueish dots, which are found in scattered order also on back and abdomen.

On the abdomen these spots are blackish as is the case on soft dorsal, anal and caudal. Pectorals dark with a yellow hindborder and a yellowish base. Ventrals reddish, with a broad blackish border, spotted with blue.

One specimen with a total length of about 45 cm, Java Sea, September 1933. Found in the catch of Japanese reef fishermen.

Literature:

1. *Plectropoma oligacanthus* BLEEKER, Nat. Tijdschr. VII, 1845, p. 422.
2. *Plectropoma oligacanthus* GÜNTHER, Catalogue Brit. Mus. I, 1859, p. 157.
3. *Acanthistius oligacanthus* BLEEKER, Ned. Tijdschr. Dierk. II, 1865, p. 281.
4. *Paracanthistius oligacanthus* BLEEKER, Atlas. Ichth. VII, 1873 '76, p. 27.
5. *Plectropoma oligacanthus* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago, 1931, p. 79.

Fam. **PEMPHERIDAE.**

PEMPHERIS CUVIER.

Pempheris sasakii (JORDAN and HUBBS).

D.V.9; A.III.41; P.II.17; V.I.5; L.1.70 + 11.

Height 2.5, head 3.5 in length. Eye large, 2.5 in head. Snout blunt, rounded, about 3 in eye, 6 in head. Maxillary dilated behind, reaching to below pupil. Teeth small, conical, curved somewhat backwards, in several rows on jaws especially anteriorly. Inconspicuous teeth on vomer and palatines. Height of caudal peduncle 12.4 in length of head and body. Dorsal, somewhat behind ventrals, twice in head. Longest rays a little longer than eye and postorbital part of head. Pectorals inserted before ventrals, below lower border of eye. Its length about as long as head without snout. Ventrals somewhat longer than eye, surpassing anus, not reaching anal. Foremost rays of anal longest, about as long as ventrals. Its length about twice in length of snout and eye. Scales rather weak, cycloid. Seven rows on cheeks. Colour brownish with a yellowish hue when alive. Tip of dorsal blackish. Border of anal and of caudal blackish too. Paired fins hyaline. Lateral line whitish.

One specimen with a total length of 18 cm from Pelabuan Ratu, south-coast of Java, August 1933.

Literature:

1. *Liopempheris sasaki* JORDAN and HUBBS, Mem. Carnegie Museum Vol. 10, 1925, p. 228.
2. *Pempheris sasaki* FOWLER, Bull. No. 100 of the Smithsonian Institution p. 62.

Pempheris nyctereutes JORDAN and EVERMANN.

D.V.10; A.III.41; P.II.17; V.I.5; L.1. 79 + 15.

Height 2.5 in head, 3.3 in length. Eye large, 2.4 in head. Snout blunt, not rounded, 2.1 in eye, 5.1 in head. Lower jaw somewhat prominent. Maxillary dilated behind, reaching to behind middle of pupil. Teeth small in several rows on jaws, especially anteriorly. Conspicuous patches of teeth on vomer and palatines. Height of caudal peduncle 11.5 in length of head and body. Dorsal inserted somewhat behind ventrals, its height about 2 in head, its longest rays somewhat shorter than head without snout. Pectorals inserted before ventrals, below border of eye, its longest rays about as long as head without snout. Ventrals somewhat longer than eye, surpassing anus not reaching anal. Foremost rays of anal longest, about as long as ventrals. Length of anal twice in length of head and body. Scales rather weak, cycloid, rather deciduous. Colour dull brown, especially on breast. Inner side of operculum blackish, shining through. Dorsal blackish all over. Caudal blackish with a yellowish hue. Anal with a blackish base and a hyaline border. Paired fins hyaline. Lateral line whitish, bordered by black.

One specimen with a total length of 12.5 cm from Pelabuan Ratu, south-coast of Java. August 1933.

Literature:

1. *Pempheris nyctereutes* JORDAN and EVERMANN, Proc. U.S. Nat. Mus. Vol. 25, 1903, p. 340.
2. *Pempheris nyctereutes* JORDAN and RICHARDSON, Memoirs Carnegie Museum Vol. 4, 1909, p. 181.
3. *Pempheris nyctereutes* FOWLER, Smithsonian Institution Bulletin no. 100, p. 62.

HISPINEN AUS JAVA UND SUMATRA, HAUPTSÄCHLICH GESAMMELT VON HERRN F. C. DRESCHER.

(53. Beitrag zur Kenntnis der Hispinen (Col., Chrys.).

Von

E. UHMANN

(Stollberg, Erzgebirge).

In dieser Arbeit wird das wertvolle Material, das mir Herr F. C. DRESCHER in Bandoeng zusandte, behandelt, wozu noch einige Arten aus den Museen zu Buitenzorg und Leiden kommen. Das Material DRESCHERS, zumeist von ihm selbst gesammelt, stammt aus West- und Mittel-Java und ist sehr sorgfältig bezettelt. Es ist daher geeignet, für eine künftige Fauna Javas die Grundlage mit zu bilden. Um Wiederholungen zu vermeiden, gebrauche ich folgende Abkürzungen für die am meisten vorkommenden Fundorte:

B Bajoekidoel Est., (Goenoeng, oder Gunung) Raoeng, Ost-Java, 450 - 700 m.
BGS Batoerraden, G. Slamat, Mittel-Java, ca 800 m.
GS G. Slamat, Mittel-Java, ca 800 m.
GT G. Tjarĕme (Tjerimai), Cheribon, West-Java.
NK Noesa Kambangan, Insel südlich von Tjilatjap, Mittel-Java.
PB Preanger (Priangan), Bandoeng, West-Java.
PTP Preanger, G. Tangkoeban Prahoe, 13 - 1650 m, West-Java.
PR Preanger, Radjamandala, 350 m, West-Java.
ZB Zuid Banjoemas, Djeroeklegi, Mittel-Java.
ZK Id., Koebangkangkoeng, Mittel-Java.
ZP Zuid Preanger, Patimoean, West-Java.

Ferner:
Mus. B. Museum Buitenzorg.

Wo hinter dem Fundort kein Sammler angegeben ist, so ist das Material von Herrn DRESCHER gesammelt worden.

Neue Arten und Abarten.

1. *Botryonopa apicalis* GEST. ab. *uniformis.*
2. „ „ ab. *vittata.*
3. *Callispa drescheri.*
4. *Brontispa affinis.*
5. *Wallaceana drescheri.*
6. *Downesia javana* Ws. ab. *nigerrima.*

7. *Agonia pallipes* SPAETH ab. *clara*.
8. „ *vicina*.
9. *Dactylispa xanthospila* GEST. ab. *picipes*.

Für Java sind 17 Arten neu, 16 davon sind teils von Sumatra, teils von Borneo bereits bekannt. *Dactylispa bakeri* GEST. von den Philippinen kommt auf Java wahrscheinlich in einer Rasse vor.

Herr DRESCHER hat mir in freigebigster Weise von seinem Material überlassen, so dass auch alle Holotypen in meine Sammlung gekommen sind. Auch an dieser Stelle sei dem eifrigen Sammler mein verbindlichster Dank dargebracht.

Neue Literatur über javanische Hispinen.

MAULIK, On the structure of larvae of Hispine beetles. Proc. Zool. Soc. London, part 3, 1931. p. 1153 ff. fig. 12-15.
SPAETH, Ist *Miltinaspis cassidoides* eine Cassidine? Kol. Rundschau 1929. p. 28 - 30.
———, Hispinen (Col.) von Java. Stylops. Vol. 2. part 12. 1933. p. 268-274.
WEISE, Hispinen der Alten Welt. Philipp. Il. Journ. Sci. Manila. 21. 1922. p. 57 - 85.
UHMANN, 8. Beitrag. Treubia, X. 1928. p. 61-63.
———, 11. — . Ent. Mitt. XVII. 1928. p. 371.
———, 18. — . Zool. Meded. XIII. 1930. p. 79.
———, 26. — . Neue Beitr. syst. Inskde. V. 1931. p. 35.
———, 40. — . Fol. Zool. Hydr. Riga. V. 1933.
———, 44. — . Bull. Mus. Hist. Nat. Belg. X. 1934.

1. **Botryonopa apicalis** GEST. — 2, PTP. 23. XII. 29, III. 34.
ab.n. **uniformis** Oberseite ganz gelbbraun. 2, BGS.
ab.n. **vittata** Scheibe des Halsschildes getrübt. Jede Decke mit einer grossen, breiten, schwarzen Längsbinde, die nur die Naht und die Ränder gelbbraun lässt. 2, NK.

2. **Lasiochila rufa** GUÉR. — 1, PTP. (Mus. B.). 1, Preanger: Selabintanah, 1400 m, XII. 32, M. E. WALSH (Mus. B.).

Anisodera-Arten aus Java. — Es liegt mir ein reichliches Material sowohl von DRESCHER als auch aus dem Museum Buitenzorg vor, das sicher eine Anzahl neuer unter sich sehr ähnlicher Arten umfasst, deren Beschreibung ich aber bis nach Eingang grösserer Reihen verschieben will. Bisher wurden viele Stücke für *gracilis* oder *lucidiventris* gehalten, während sie in Wirklichkeit zu neuen Arten gehören. Man vermutete nicht so viel *Anisodera*-Arten in Java! GESTRO (und auch ich) hat manches falsch determiniert, woraus ihm durchaus kein Vorwurf gemacht werden kann und soll. Die Irrtümer entspringen zunächst aus den unzulänglichen Beschreibungen GUÉRINS, ferner sind die vielen Arten einander ausserordentlich ähnlich und doch wiederum in sich so veränderlich, dass es eines genauesten Studiums und Typenvergleichs bedarf, um nur einigermassen sicher bestimmen zu können. Hellbraune und dunkle Tiere derselben Art sind oft nicht ohne weiteres als zusammengehörig zu erkennen, dazu kommen beträchtliche Grössenunterschiede. Mein Schlüssel im 18. Beitrag, p. 78 ff. ist hinsichtlich der Arten ab 15″ unzuverlässig, weil dorthin einige neue, noch nicht beschriebene Arten gehören.

3. **Anisodera elongata** Gest. — Bekannt aus Süd-Sumatra, neu für Java. Lauter ♀ ♀. 1, Süd-Sumatra, Lampongs, G. Tanggamoes, Oeloebeloe, 2 - 500 m; 2 ♀, id., de Giesting, 500 m; 1, BGS. 1 - 12. IX. 1927. 1, GS. 31. I. 26.

4. **Anisodera bowringi** Baly. — 2, ZB. 9. I. 30.

5. **Anisodera scutellata** Baly. — 2, BGS. I. 1927. 1, West-Java, G. Tjisoeroe, Djampang Tengah, 6 - 800 m, XI. 33, M. E. Walsh (Mus. B.).

6. **Anisodera lucidiventris** Guér. — 3, GS. IV. 1925. 2 NK. 26. XI. 1932. Mus. B.: 1 ♀, West-Java, G. Tjisoeroe, Djampang Tengah, 6 - 800 m, XI. 1933 (M. E. Walsh); 2 ♂ West-Java, Depok (H. H. Karny).

7. **Anisodera gracilis** Guér. — 2, West-Java, G. Pangerango, 8. IV. 1899, 3000′ (Carl Auriv.) Museum Stockholm. Diese beiden Stücke, die ich nach der Beschreibung hierher stellen muss, zeichnen sich aus durch glänzende Oberseite, einzeln abgerundete Deckenspitzen ohne Nahtzähnchen. Fühlerglieder $^5/_3$. Die Art hat grosse Aehnlichkeit mit *humilis* Gest. ist aber glänzend, hat auf dem Halsschild doppelte Punktierung, von der die feine recht deutlich ist, auf den Decken stehen die Punkte dichter und sind grösser. Rippen schwach entwickelt, die 1. nur im Enddrittel, die 2. beginnt etwa vor der Mitte und endet nach Beginn des Absturzes, die 3. läuft von der Schulter bis zur Spitze durch. Die Rippen sind, soweit vorhanden, vollständig, während bei *humilis* kurze Unterbrechungen zu sehen sind. Bemerkenswert an den beiden mir vorliegenden Stücken ist die schwache, aber deutliche Erweiterung der Vorderecken, wodurch sie neben *candezei* Gest. und *bloetei* Uh. (18. p. 79) zu stehen kommt. Bei *humilis* sind die Vorderecken kaum erweitert.

8. **Callispa amabilis** Gest. — 1, Mittel-Java, Simpar, 3000′, Tegal. XII. 1890 (Th. F. Lucassen), Museum Leiden. Bisher bekannt aus Borneo und Sumatra. Färbung der Decken abweichend von der Beschreibung: Seitenrand nur bis zur Deckenmitte schwarz, auf ihrer Hinterhälfte ein grosser, gemeinsamer, schwarzer Fleck, der die Deckenränder frei lässt.

9. **Callispa drescheri** n.sp. — Late ovata, nitida, obscure rufo-testacea, elytrorum apice nigro-coeruleo, antennis nigris, articulo primo rufo-fulvo. — Processu frontali breviter acute producto, fronte subtilissime punctulata, nitida; antennis articulis duobus basalibus brevibus, tertio his simul sumptis longitudine aequali, ceteris brevioribus; prothorace valde transverso, lateribus rotundatis, antrorsum convergentibus, margine laterali tenuiter marginato, laevi, disco parum convexo, irregulariter punctato, antice laevi; scuto transverso, pentagonio, laevi; elytris prothorace parum latioribus, parum convexis, protecto non separato, striis duabus tenuibus irregularibus.

Der mir unbekannten *C. doriae* Gest. aus Sumatra sehr ähnlich, aber Oberseite ganz glänzend, der fein abgesetzte Rand des Halsschildes glatt. Fühler gleich stark. — Kopf ausserordentlich fein punktiert, vorn kurz zugespitzt, Augen nicht aus der Wölbung des Kopfes heraustretend. — 3. Fühlerglied so lang wie 1 + 2. — Halsschild an der Basis reichlich doppelt so breit wie lang, Seiten nach vorn gerundet — verengt, Vorderrand fast halb so breit wie der Hinterrand. Vorderecken breit verrundet, Hinterecken fast rechtwinklig. Wöl-

bung bis an den fein gerandeten Seitenrand gewölbt, vorn glatt, sonst zerstreut punktiert, nach den Seiten zu dichter. — Decken mit 10 regelmässigen Punktreihen, deren Punkte zur Spitze zu feiner werden. Reihe 6 und 7 beginnen erst in, bez. hinter der Mitte. Seitendach in einer Flucht mit den Decken gewölbt, mit 2 unregelmässig verlaufenden Punktreihen.

1, ZP. 10 - 15. XI. 1925 (Holotypus). 1, ZK. 14. VIII. 1927.

10. **Callispa splendidula** GEST. — 2, BGS. V. 1933. Neu für Java. 1, West-Java, G. Gedeh, Tapos, 800 m, VI. 31, M. A. LIEFTINCK (Mus. B.).

11. **Callispa marginipennis** GEST. — 2, NK. 6. — 19. IX. 1927. Neu für Java.

12. **Callispa elegans** BALY. — 3, West-Java, G. Salak, Waroeng Loa (Tjiomas), II. 32, M. A. LIEFTINCK (Mus. B.) Neu fur Java.

13. **Callispa pusilla** GEST. — 2, NK (s.o.) 2, BGS. Neu für Java.

14. **Miltinaspis (Melispa) cassidoides** GUÉR. — Je 2, BGS. PTP.

15. **Leptispa bicornis** SPAETH. — 1, GS. 12. VII. 1925. 4, Mittel-Java, G. Soembing, 1800 m, 21. V. 1933 (L. J. TOXOPEUS).

16. **Brontispa javana** WS. — 2, BGS. VII. 1928. Skutellarstreif sehr kurz.

17. **Brontispa affinis** n.sp. — Elongata, depressa, supra nitidula, nigra, subtus flavo-testacea, nitida. Prothorace ut in *B. angulosa* UH. (vide 26. p. 35. fig. 2); elytris magnitudine fere triplici prothoracis, antice stria suturali excepta octo-, post medium decem-striatis, interstitio 2., 4., 8. in totum leviter carinatis, 6. postice carinato; sternito ultimo maris apice emarginato, feminae rotundato. ♂ 5,5, ♀ 6,1 mm.

Der *B. banguiensis* UH. von den Philippinen äussert ähnlich, aber Oberseite ganz schwarz, Halsschild auf den punktierten Teilen dichter punktiert, secundäre Zwischenräume zwar schwach, aber deutlicher erhaben, der 6. nur hinter der Mitte vorhanden und erhaben. Skutellarstreif vorhanden, bei *banguiensis*, *surigaoana* UH. und *angulosa* UH. fehlend. Decken in beiden Geschlechtern deutlich abgestutzt.

♂: Letztes Sternit deutlich ausgerandet. Decken parallel. ♀: Letztes Sternit abgerundet, Decken hinten erweitert. 1 ♂, 1 ♀, NK. ♂ Holotypus.

18. **Plesispa reichei** CHAP. — 1 Mittel-Java, Kemanglen, Tegal (TH. F. LUCASSEN, X. 1889). 2, BGS. IV. X. 1928.

19. **Drescheria reinecki** WS. — 2, Preanger: Kalipoetjang, 16. VI. 1926. 1, Kemanglen, Tegal (TH. F. LUCASSEN, VII. 1889). Fühlertoment $^4/_5$.

20. **Prionispa vethi** GEST. — 2, PTP.

21. **Prionispa subopaca** CHAP. — 2, BGS.

22. **Prionispa fulvicollis** GUÉR. — 1, Süd-Sumatra, G. Tanggamoes, Giesting, 600 m, XII. 34, und 1, West-Java, Tjisolok (Wijnkoopsbaai) 13. IV. 31, M. A. LIEFTINCK (Mus. B.).

23. **Oncocephala tuberculata** OL. Java: Pasoeroean; Tandjong Priok; Malang; Toegoe; Ardjoeno (Mus. Leiden).

24. **Javeta manicata** GEST. (*Agonia*). — Die schwarze Apikal-Färbung der Decken dehnt sich aus, bis sie schliesslich das Enddrittel bedeckt. Beine

schwarz. Der *J. corporaali* Ws. sehr ähnlich, die aber gelbbraune Beine mit dunklen Tarsen hat. Vielleicht ist letztere nur als Aberration zu betrachten. 2, NK. 3.-8. VIII. 1927. 4, BGS. I, II, X. 26. IV. 27.

25. **Promecotheca cumingi** Baly. — 2, Java. Auf Blättern der Nipa-Palme (Mus. Leiden).

26. **Wallaceana drescheri** n.sp. — Supra nitidula, antennis obscure brunneis, capite prothoraceque flavo-testaceis, hoc lateribus punctatis late nigris, scuto flavo-testaceo, elytris flavis; circum scutum, sutura postice abbreviata, intervallo secundo medio, humero, vitta sublaterali, fascia tranversa ante partem declivem nigris, costa tertia apiceque flavo-testaceis. Subtus flava. — Prothorace transverso, antice latiore quam basi, margine laterali leviter undulato, disco in utroque latere dense punctato; elytris costis quatuor, quarta solum in parte apicali. — Long. 4 - 4, 75 mm.

Durch ihre drei Farben und die Zeichnung auf den Decken von allen *Wallaceana*-Arten verschieden, sonst der *W. apicalis* Gest. ähnlich, aber Halsschild vorn unmittelbar hinter den Vorderecken breit heraustretend. Basis schmäler als der Vorderrand, Seiten schwach unduliert, nach vorn divergent, von der Mitte ab fast parallel, mit dem Vorderrand in einer abgerundeten Ecke zusammenstossend. Scheibe beiderseits schwach eingedrückt und dort dicht und stark punktiert. — Schildchen klein, oval. — Decken mit 4 Rippen, von denen die 3 inneren auf dem Abfall aufhören, die 4. nur im Spitzenteil. 1. Rippe schwach erhaben, vorn verflacht, die andern scharf gekielt, die 2. vorn breiter. 1. — 3. Zwischenstreif mit regelmässigen Doppelreihen, 7. Reihe vollständig, 8. nur hinten neben der 4. Rippe, die sie von der 7. Reihe trennt, 9. und 10. Reihe getrennt, vollständig. Seitenrand schmal, verflacht abgesetzt. Jede Decke an der Spitze schwach einzeln abgerundet, mit kleinem Nahtzähnchen.

2, BGS. V. 1928 (Holotypus), 13. VI. 28 (Paratypus).

27. **Wallaceana apicalis** Gest. — Kopula. BGS. Jan. 1933. ♂: 5,5 mm, ♀: 7 mm. Dieser Grössenunterschied der beiden Geschlechter ist bei den *Wallaceana*-Arten immer zu berücksichtigen. Beim ♂ ist das letzte Sternit ausgebuchtet, beim ♀ gerade abgestutzt und auf einer abgegrenzten, rundlichen Fläche dichter punktiert. 1, GS. 29. VIII. 25.

28. **Wallaceana palmarum** Gest. — 1, Mittel-Java: Semarang (E. Jacobson leg. Mus. Leiden). Ich erhielt von Herrn Maulik ein Stück von Singapore (N. H. Ridley), das vielleicht aus der Originalausbeute stammt (vergl. Ann. Mus. Civ. Stor. Nat. Gen. 3, VI (XLVI) 1912. p. 44) und mit einem Typus von ihm verglichen worden ist. Das javanische Stück vermag ich nicht von ihm zu unterscheiden. Ein 3. und 4. Stück Java or.: Ardjoeno (Hekmeyer), haben eine nur leicht angedunkelte Deckenspitze. Das Fehlen oder Vorhandensein einer schwarzen Färbung auf den distalen Teil der Decken kann meiner Meinung nach allein nicht als arttrennendes Merkmal angesehen werden. So sah ich von *impicta* Uh. von den Philippinen eine grosse Anzahl Stücke mit schwarzem Enddrittel der Decken, vergl. auch das Fehlen von schwarzen Diskalflecken bei *Dactylispa*-Arten der Philippinen, z.B. *miranda* Gest., *isaroensis*

UH., *infuscata* CHAP. usw. Ueber einfarbige *palmarum*-Stücke berichtet WEISE, Suppl. Tijdschr. Ent. LXVII, 1924, p. 81. Das von mir bisher studierte Material erlaubt mir nicht *apicalis* GEST. und *palmarum* GEST. sicher zu trennen.

29. **Wallaceana marginata** GEST. — 3, PTP. Bei einem dieser Stücke sind die Decken bis über die Hälfte geschwärzt, an der Naht fast bis zum Schildchen. — 2, ZK. 1. V. 27. Bei diesen beiden Stücken ist die schwarze Randfärbung sehr schmal und recht schwach. Neu für Java.

30. **Downesia javana** WS. — 4,5 - 5,5 mm, nach WEISE 3,5 - 4 mm 6, GS. 13. VII. 25; 1, NK. X. 25; 4, BGS. 30. VII. 26; 1, Preanger: Kalipoetjang. 16. VI. 26.

ab.n. **nigerrima.** Körper ganz schwarz, Abdomen pechfarben. 6, B. III., IV. 34 (H. LUCHT) und X., XI., XII. 1931 (DRESCHER). Herr Dr. A. ROMAN hat liebenswürdigerweise den Holotypus im Naturhistorischen Reichsmuseum in Stockholm hinsichtlich der Punktreihen auf den Decken untersucht. Daraus geht hervor, dass in der Beschreibung WEISES (Philipp. Il. Journ. Manila. 21. 1922. p. 73) hinter „von denen die beiden ersten" das Wort „Reihen" einzufügen ist. Ich hatte seinerzeit „Doppelreihen" ergänzt und meine *„nitida"* (8. p. 62) aufgestellt. Diese ist nach obigen Feststellungen synonym mit *javana.*

31. **Downesia sumatrana** GEST.? — 1, O. Gebangan Weberi. III. 28; L, BGS. 20. XI. 27. Die Stücke messen 7 mm, nach WEISE 5⅔.

32. **Downesia perniciosa** SPAETH. — 4, GT. 27. VII. 25. Die Stücke sind ganz schwarz. SPAETH hat offenbar noch nicht völlig ausgefärbte Stücke vor sich gehabt.

33. **Agonia jacobsoni** UH. — 5, Mittel-Sumatra, Loeboek Sikaping, 450 m, L. HUNDESHAGEN (Mus. B.).

34. **Agonia vicina** n.sp. — Der *jacobsoni* ausserordentlich ähnlich. Man könnte die Stücke für immatur halten. Färbung gelbbraun, schwarz: Fühler, Hals ausser der Mitte, Halsschild-Seitenrand sehr schmal, Naht sehr schmal, bei einem Stück auch der Hinterrand, Beine ausser der Schenkelbasis, bei den Vorder- und Mittelschenkeln die Hälfte oder noch mehr hell, Vorderschienen innen hell. — Halsschild-Seiten stärker geschweift, Hinterwinkel weiter nach aussen tretend, Deckenhinterrand weniger stark gerundet, fast gerade abgestutzt. — 9 - 10 mm. Sonst wie *jacobsoni,* vergl. 11. Beitrag. — Holotypus: PTP, VIII. 34, daher auch 2 Paratypen: 1, BGS, X. 33 (LIEFTINCK) und 3, West-Java, G. Gedeh, Tjibeureum, 1700 m, VIII. 31, M. A. LIEFTINCK. Alle Typen im Mus. B.

35. **Agonia corrugata** SPAETH. — 3, West-Java, G. Tjisoeroe, Djampang Tengah, 6 - 800 m, M. E. WALSH (Mus. B.). Bei 2 Stück sind die Halsschild-Seiten mehr oder weniger breit angedunkelt.

36. **Agonia opacula** SPAETH. — 2, GT, 30. VI. 26; 4, GS, 12. VII. 25; 1, BGS, 22. II. 32; 2, Preanger, G. Papandajan, Tjisoeroepan, 12. VI. 29. Stücke der Nominatform. Auch diese Art ändert sehr in der Farbe ab, wenigstens ist es mir nicht möglich, bei den nachstehend untersuchten Stücken andere als Farbunterschiede zu finden. Bei einigen der normalen *opacula*-Stücke findet

sich auf jeder Decke neben dem Schildchen eine dunkelrote Stelle, die nur bei genauem Hinsehen sichtbar ist. Bei der einen Aberration wird dort ein gelbbrauner Fleck bemerkbar, zu dem vorm Abfall noch ein weiterer kommt, der von der 1. bis zur 2. Rippe reicht. Beide Fleckenpaare haben das Bestreben, Querbinden zu bilden. Schliesslich vergrössert sich auch die Mittelbinde auf dem Halsschild so, dass die Basis hell wird, zuletzt ist er ganz gelbbraun. Bei diesen hellen Formen wird auch das Schwarz weniger intensiv. Bei einem Stück (G. Tjikoendoel) bleibt nur schwarz: der Seitenrand sehr schmal, die Spitze breiter, ein Fleck auf jeder von der 2. Rippe bis zum Rande. — Beine und Unterseite verschieden gefärbt, Tarsen immer dunkel. Von der Nominatform in der Färbung abweichende Stücke: 2, GT, 30. VI. 25; 1, GS. 12. VII. 25; 1, BGS, 13. VI. 28; 1, B, 1. X. 32 (H. Lucht); 1, G. Tjikoendoel, Soekaboemi, III. 33 (F. Verbeek); 1, C.O. Nandjoeng Djaja, 600 m, Preanger (C. de Haas).

37. **Agonia pallipes** Spaeth. — 2, GS. 12. VII 25; 1, West-Java Preanger, Lembang, 2. VIII. 25; 3, GT. Decken bei diesen allen parallel, ♂♂.

1, GS. 12. VII. 25; 3, BGS, VII, VIII. 26. Decken bei diesen allen nach hinten schwach erweitert, ♀♀. Stücke der Nominatform. 1, West-Java, G. Panggerango, Tjisaroea, 1050 m, VII. 30, M. A. Lieftinck (Mus. B.). Ein in der Färbung ebenfalls sehr veränderliche Art. Unterseite bei einigen Stücken ganz schwarz. Folgende Stücke mit gelbbrauner Basalhälfte: 3, B. II, V, XI (H. Lucht); 1, GS. X. 25; 1. BGS, VIII, 26. Bei einem unausgefärbten Stück von B., 14. XI. 31, ist der Teil der Decken, der vollausgefärbt schwarz ist, an der etwas angedunkelten braunen Farbe zu erkennen. Die Färbung kann sich weiter aufhellen bei der folgenden Aberration, die in der Skulptur keine Unterschiede von den dunkeln Formen aufweist. Wegen der extremen Färbung verdient diese Abart besonders benannt zu werden.

ab. n. **clara**. Ganz hellgelb. Fühler dunkel. 2, GT. 27. VII. 25 (Holotypus); 30. VI. 26. Sicher n i c h t immatur!

38. **Agonia malangensis** Ws. — 2, B. II, VIII. 32 (H. Lucht).

39. **Agonia clavareaui** Gest. — 3, NK. 1, ZK. 26. I. 31. Neu für Java.

40. **Agonia spathoglottis** Uh. — 4, GS, 15-17. VIII. 25; 3, BGS, I. VIII. 26; 4, PB, III. V. 32 (L. J. Toxopeus); 1, PTP (Mus. B.). Beim dunkelsten Stück ist der Halsschild schwarz mit 2 kleinen, hellen Flecken an der Basalkante. Beim hellsten Stück dehnt sich die gelbbraune Färbung so aus, dass auf den Decken nur schwarz bleiben: Die Schultern und mit ihr verbunden eine an der Naht unterbrochene Querbinde in der Mitte der Decken, ein von dieser Zeichnung umschlossener schwarzer Fleck auf der 1. Rippe hinterm Schildchen, eine an der Naht unterbrochene Querbinde vor der Spitze.

var. **undata** Uh. 1, West-Java, Buitenzorg, IX. 07. (E. Jacobson, Mus. Leiden).

41. **Agonia javanica** Gest. — 1, ZP. VI. 25. 2. Raum an der Basis mit einigen überzähligen Punkten.

42. **Agonia horsfieldi** Baly. — 2, NK, VIII. 27; 1, GS, 1. II. 26. 1, BGS, 30. VIII. 26.

43. **Gonophora bowringi** BALY. — 3, ZB, VII. 30. 32; 1, NK, 16. VII. 32. In Mus. Leiden: 1, Pengalengan, 4000', 1893 (H. FRUHSTORFER); 5, Batavia, X. XI. 1907 (E. JACOBSON). 1, West-Java, G. Tjisoeroe, Djampang Tengah, M. E. WALSH (Mus. B.).

44. **Gonophora xanthomelaena** WIEDEM. — In Anzahl von den erwähnten Fundorten. Bei den hellsten Stücken sind auf jeder Decke nur 3 kleine schwarze Flecke vorhanden (Idjen Plateau). In Mus. B: 1, West-Java, G. Pantjar, 500 m, VIII. 31 und 1, G. Gedeh, Tapos 800 m, X. 32 (M. A. LIEFTINCK); 1, G. Tjisoeroe, Djampang Tengah, 600 - 800 m, IX. 1933 (M. E. WALSH).

45. **Gonophora integra** BALY. — 4, NK. 4. X. 25; 8, GS. 12. II. 25; 2, ZK, 26. XI. 31; 2, PTP. IV. 1934. 1, Java occ.: Soekaboemi, 2000'. 1893 (H. FRUHSTORFER). Im Mus. B. folgende von West-Java: 3, PTP. (F. C. DRESCHER). 2, Tjibodas, G. Gedeh, 1450 m.; 1, Buitenzorg; 2, Salak, G. Boender, 800 m, IV. 31 (M. A. LIEFTINCK). 5, G. Tjisoeroe, Djampang Tengah, XI. 1933 (M. E. WALSH).

46. **Gonophora taylori** SPAETH. — 3, GS, 16. VIII. 25; 1, BGS, V. 26.

47. **Gon. (Micrispa) sinuata** GEST. — 1, GS, 12. VII. 25. Halsschild ganz dunkel, die gelbbraunen Hinterecken der Decken sehr klein.

48. **Gon. (Micrispa) minuscula** GEST. — 1, Preanger (P. F. SIJTHOFF). Neu für Java.

49. **Gon. (Micrispa) javana** WS. — 2, NK. 4. X. 25. — 1, GS. VI. 1925 halte ich für eine dunkle Aberration dieser hellen Art. Es zeigt keinerlei skulpturelle Unterscheide, ist aber ganz dunkel, hell sind nur: Mitte der Fühler, 3 Flecke auf der 1. Rippe, 2 Flecke, die der 2. und 3. Rippe gemeinsam sind und vor und hinter der Unterbrechung der 3. Rippe liegen.

50. **Asamangulia wakkeri** ZEHNT. — 6, BGS; 3, ZB; 1, ZP; 1, PTP; 2, Preanger: Lembang. Mus. Leiden: Soerabaja (Dr. H. J. DAHT); Tegal, Simpar, 3000' (TH. F. LUCASSEN).

51. **Rhadinosa parvula** MOTSCH. — 20, von den üblichen Fundorten.

52. **Dactylispa cladophora** GUÉR. — 1. PR. 13. III. 31. Ganz gelbbraun. Unterscheidet sich von *angusta* GEST. von den Philippinen auf den ersten Blick durch die ziemlich lang behaarten Decken und durch die sehr schlanken, zur Spitze nicht verdickten Fühler, vergl. 40. p. 73. Dornen der Decken lang, schlank. Raum I mit einem Dörnchen in der Mitte; II mit 4 Dornen: 2 vor, 2 hinter der Mitte, der letzte auf dem Abfall; IV mit 4 Dornen: 2 kleine auf der Schulterfäche, 1 Dorn in der Mitte, 1 am Abfall zwischen Dorn 3 und 4 von II; VI mit 7 Dornen: 4 auf der Schulter, der 5. ist der Folgedorn, 6 und 7 vor und hinter dem schwachen Eindruck, 6 neben dem 2. von II, 7 zwischen Dorn 3 von IV und dem 3. von II; VIII mit 2 Dornen: 1 neben Dorn 3 von IV und 1 neben Dorn 4 von IV.

53. **Dactylispa discoidalis** CHAP. — In Anzahl, meist dunkle Stücke. In 44, p. 4 lies Zeile 27 statt „vorm 2. des 2. Raumes" „vorm 2. des 4. Raumes".

54. **Dactylispa drescheri** WS. — 3, GS; 2, NK; 2, PR; 2, BGS; 1, ZK; 1, Kalipoetjang. Der Halsschild ändert in der Farbe ab von gelbbraun bis

schwarz mit hellerem Hinter- und Vorderrand. Am nächsten mit *xanthospila* wegen der Halsschild-Seitendornen verwandt. Man könnte die Art für eine Aberration von ihr halten, aber der matte Halsschild mit seiner dichten Punktierung, die aneinander gedrängten Punktreihen der Decken und die kleinen Dörnchen der Halsschilddornen trennen sie von *xanthospila*. In der Bedornung der Decken stimmen beide Arten fast überein. Raum II mit 4 Dornen: 2 vor, 2 hinter der Mitte, zuweilen vergrössert sich das auf dem Abfall stehende Dörnchen zu einem gösseren Dorn; IV mit 3 Dornen: ein kleiner auf der Schulterfläche, der 2. zwischen 3 und 4 und der 3. neben dem 4. von II; VI mit 6 Dornen: 4 auf der Schulter, der 5. vorm 2., der 6. vorm 3. von IV; VIII mit 2 Dornen: der eine zwischen Dornen 5 und 6 von VI und der andere neben dem letzten von IV. Kleine Dörnchen gibt es eine Reihe auf der Naht und einige auf dem Abfall.

55. **Dactylispa xanthospila** Gest. — 8, NK; 1, ZK. Oberseite ganz schwarz, auf den Decken eine V-förmige Querbinde mehr oder weniger gelbbraun. Verteilung der Dornen wie bei *drescheri*, auf VI fehlt aber der 5. Dorn in der Mitte. — 7, B. (Drescher und Lucht): Oberseite gelbbraun, Dornen der Decken schwarz, jeder Dorn steht in einem schwarzen Fleckchen. Decken stark glänzend; ebenso 1 Ost-Java, Idjen, Blawan, 950 m, VI. 24 (K. W. Dammerman, Mus. B.).

ab. n. **picipes**. 1, ZK (Holotypus); 1, NK; 1, GS; 2, BGS; 2, ZB. Beine dunkelbraun bis schwarz.

56. **Dactylispa nemoralis** Gest. — 3, BGS; 1, GS; 2, PTP. Mus. Leiden: 1, Simpar, 3000′, Tegal (Th. F. Lucassen, XI. 1890).

57. **Dactylispa vulgaris** Gest. — Mus. Leiden, siehe voriges Stück.

58. **Dactylispa kerimi** Gest. — 1, Java (Mus. Leiden). Halsschild und Decken ganz schwarz. Neu für Java.

59. **Dactylispa modigliani** Gest. — Je 1, NK; ZB; ZK; Kalipoetjang, 6. V. 25. Mus. Leiden: Simpar, Tegal. 3000′. IX. 1890 (Lucassen); Toegoe (J. D. Pasteur); Soekaboemi, 2000′. 1893 (Fruhstorfer); 1, West-Java, G. Tjisoeroe, Djampang Tengah, 6-800 m, IX. 1933, M. E. Walsh (Mus. B.).

60. **Dactylispa vethi** Gest. — 3, PTP. Halsschild auf der Scheibe bei 2 St. mit 2 dunklen Flecken.

61. **Dactylispa jacobsoni** Uh. — 1, BGS. VII. 26. Neu für Java.

62. **Dactylispa sumatrana** Ws. — 1, PR. 27. III. 33. Neu für Java.

63. **Dactylispa leptacantha** Gest. — 1, PTP. 7. XII. 33. Neu für Java.

64. **Dactylispa ramuligera** Chap. (*bellula* Gest.) Mus. Leiden: Je 1, Malang: Idjen Geb. (A. Koller); Montes Tengger, 4000′, 1890 (Fruhstorfer). Verwandt ist diese Art mit *intactilis* Gest. und *cladophora* Guér. Vergl. 44. p. 3. Neu für Java.

65. **Dactylispa manteroi** Gest. — 1, NK. 11. IX. 32. Decken braun gerandet. Vergl. Gestro: Ann. Mus. Civ. Gen. 1897. p. 105. Neu für Java.

66. **Dactylispa aspera** Gest. — 1, ZK. 25. X. 31.

67. **Dactylispa bakeri** Gest. — 1, ZP. XI. 25. Mus. Leiden: 2, Sema-

rang (E. JACOBSON); 24, Java or: Pasoeroean (J. D. KOBUS), auf Zuckerrohr. Diese von den Philippinen, Davao, beschriebene Art lag mir noch in 2 St. vom gleichen Fundort und sicher aus derselben Ausbeute aus der Smithsonian Institution des Museums zu Washington (6564) vor. Mit diesen beiden Stücken stimmen die von Java fast überein, jedoch ist die Neigung zur Verkürzung aller Dornen nicht zu verkennen. Vor allem erscheinen die Seitenrand-Dornen der Decken kürzer und stärker nach hinten gekrümmt, sie bleiben aber doch länger als die der Scheibe. Ob die javanischen Stücke einer besonderen Rasse zugerechnet werden können, muss erst grösseres Material von den *Philippinen* zeigen. (40. p. 73).

68. **Hispa armigera** OL. — 1, ZP. 1, PTP, 1, Südl. Mittel-Java, Babakan, III. 1933, M. A. LIEFTINCK (Mus. B.).

69. **Hispa alternata** CHAP. — 15, von den verschiedenen Fundorten. In Mus. B.: 11, West-Java, Danoe Pangkalan (G. Goentoer), 1500 m., IV. 1930, und G. Gedeh, Telagawarna am Poentjak-Pass, 1480 m, V. 1930 (M. A. LIEFTINCK).

70. **Platypria dimidiata** CHAP. — 1, NK; 2, BGS.

71. **Platypria echinogale** GEST. — 2, GS; 1, BGS. Neu für Java. In Mus. B.: 1, PTP; 1, Ost-Soemba, Mao Marroe, 450 m, V. 1925 (K. W. DAMMERMAN).

HERPETOLOGISCHE NOTIZEN XI [1]).

Bemerkungen über *Naja naja leucodira* (Blgr.)

Von

Dr. F. KOPSTEIN

(Magelang, Java).

Im Juli 1934 erhielt ich von Herrn Dr. L. J. Toxopeus in Bandoeng ein erwachsenes, lebendes ♂ dieser biologisch noch gänzlich unbekannten Kobra, die Dr. T. auf seiner entomologischen Exkursion nach Süd-Sumatra, auf dem Gipfel des Tanggamoes erbeutet hatte. Nachdem ich diese Schlange ein Jahr lang im Laboratorium beobachten konnte, und da die herpetologische Literatur m.W. über die *leucodira*-Rasse noch gar keine biologischen Mitteilungen enthält, will ich hier über meine Wahrnehmungen berichten. Auch unsere systematischen Kenntnisse über *N. n. leucodira* sind noch ziemlich bescheiden. In den Sammlungen scheint diese Schlange bloss wenig vertreten zu sein, wie die spärlichen Notizen annehmen lassen. Es war mir darum sehr willkommen, dass ich unter meinen Aufzeichnungen die Beschreibung von 2 weiteren Exemplaren aus der Kollektion des Zoologischen Museums in Buitenzorg fand, wodurch ich nun in der Lage bin, die morphologische Beschreibung von 3 Exemplaren zu geben:

1). ad. ♂; Tanggamoes; ± 2100 m; Lampongs; Süd-Sumatra; VII. 1934; coll. Dr. L. J. Toxopeus.

Sq. 21-17-13; V. 184 + 1; Sc. 2/2 + 1 + 48/48.

Totale Länge 139 cm; Schwanz 20 cm.

Augen klein, kleiner als bei einer gleich langen *N. n. sputatrix*. Rostrale 1½ mal so breit als hoch, von oben sichtbar. Internasalia kürzer als die Praefrontalia, in Kontakt mit dem Praeoculare. Frontale etwas länger als breit, etwas breiter als die Supraocularia, ebensolang als der Abstand vom Rostrale. 1 Praeoculare; rechts 2, links 3 Postocularia. Temporalia 2 + 3. 6 Supralabialia; das 3. am höchsten und in Kontakt mit dem unteren Postoculare; das 6. am längsten und nicht in Berührung mit dem Postoculare; das 3. Supralabiale unter dem Auge. Dieses Schild besteht wahrscheinlich aus der Verschmelzung des 3. und 4. Supralabiale, was links angedeutet ist. 4 Sublabialia berühren jederseits das vordere Kinnschildpaar, welches etwas länger ist als das folgende. Beide Kinnschildpaare gleich breit; das

[1]) Cfr. Treubia, Vol. X, p. 467; Vol. XI, p. 301; Vol. XII, p. 273; Vol. XIII, p. 1; Vol. XIV, p. 73 und 78; Vol. XV p. 51.

hintere Paar distal durch eine Schuppe voneinander getrennt. Hals nicht sehr ausdehnbar, etwa ebenso weit als bei *Naja naja sputatrix*.

BESCHREIBUNG DES LEBENDEN EXEMPLARES:

Das lebende Tier macht einen beinahe weissen Eindruck, mit zahllosen kleinen, dunklen Flecken. Die Zwischenschuppenhaut ist weiss. Alle dorsalen Schuppen sind distal dunkel graubraun, proximal weisslich gelb gefärbt; der dunkle Teil der Schuppen ist um so grösser, je näher diese zum Kopf, resp. zur Dorsalregion liegen. Die dunklen Schuppenpartien sind scharf von den lichten abgegrenzt. Gänzlich dunkelbraun sind nur 10 unmittelbar hinter den Parietalen gelegene Schuppen. Je mehr lateral- und caudalwärts die Schuppen liegen, um so mehr überwiegt die weissliche Farbe. Die Schwanzoberseite erscheint noch heller als das Rumpfende. Die dorsale Halsgegend ist 11 bis 16 Schuppen breit dünkler als der Rumpf und wird beiderseits durch eine schwarze Linie eingesäumt, worauf lateral einfärbig weisse Schuppen folgen. Eine Brillenzeichnung fehlt; die eben genannten schwarzen Linien täuschen aber, wenn die Schlange sich aufrichtet, einen Brille vor. Der Kopf ist oberseits graubraun, seitlich lichter braun gefärbt.

Die Unterseite ist einfärbig weisslich, mit einem undeutlichen, grauen Querband auf dem 20.-25. Ventrale. Darvor liegen 4 unsymmetrische, schwärzliche Flecke u.zw. 2 auf dem Halse rechts (auf dem 10. + 11; resp. 14. + 15. Ventrale), 1 links (auf dem 10.-13. Ventrale) und 1 in der Mitte der Kehlgegend (auf dem 5. + 6. Ventrale). Letzterer ist noch von einigen kleinen, graubraunen Flecken umgeben.

2). ad.; Fort de Kock; ± 920 m; Westküste von Sumatra; VI. 1932; coll. Dr. E. JACOBSON; Zool. Museum Buitenzorg.
Sq. 21-19; V. 183 + 1; Sc. 51; totale Länge 119 cm.
Dieses Exemplar macht einen dünkleren Eindruck als das vorhergehende. Die Oberseite ist eher braun, die seitlichen Schuppenreihen jedoch zeigen auf allen Schuppen hellgelbe Flecke. Eine Brillenzeichnung fehlt. Die hellgelbe Unterseite erscheint grau gesprenkelt. Auf dem 21.-28. Ventrale liegt eine gut abgegrenzte, dunkle Querbinde. Auf dem Halse befindet sich ein symmetrisches, schwarzes Fleckenpaar und ein unsymmetrischer dunkler Fleck. Die braune Nackenfärbung ist auch hier durch einen schwarzen Rand gegen die hellgelbe Halsseite abgesetzt.

3). ad.; Fort de Kock?; coll. Dr. E. JACOBSON; Zool. Mus. Buitenzorg.
Sq. 21-17; V. 185 + 1; Sc. 53; totale Länge 130 cm.
Dieses Exemplar macht einen helleren Eindruck als das vorhergehende Die Schlange ist vornehmlich hellgelb gefärbt. Die seitlichen Schuppenreihen sind licht, mit bräunlichen Spitzen. Dorsal und cranialwärts sind diese dunklen Enden grösser als lateral und caudal. Die Unterseite ist einfärbig hellgelb, ohne graue Sprenkelung. Die dunkle Querbinde liegt auf dem 17.-19. Ventrale und ist bloss angedeutet. Auf dem Halse kleine, symmetrische, bräunliche Flecke.

Das dunkle Pigment scheint sich stets auf dem distalen Teil der Schuppen zu befinden.

Minangkabau-Name: O e l a s a n d o e.

In der Literatur fand ich die folgenden Exemplare und Fundorte genannt:

Fundort in Sumatra	Sq. (Nacken)	Sq. (Rumpf)	V.	Sc.
Moeara Laboe (1)	?	?	189 + 1	3/3+2+49/49
„ „ (1)	?	?	188 + 1	5+42/42+?
Fort de Kock (3)	19		187 + 1	5+33/33
„ „ (3)	„		183 + 1	5+43/43
„ „ (3)	„		183 + 1	5+43/43
„ „ (3)	„		183 + 1	4/4+1+45/45
Moeara Kiawai (Ophir distrikt) (3)	17		191 + 1	48/48
Medan (4)	23—25	17—19	?	?
Battak-Gebirge; West-Sum. (800—1000 m) (5)	25	19	191	52

Wir kennen gegenwärtig *N. n. leucodira* von Moeara Laboe (1), Singkarak (2), Ranau (2), Fort de Kock (3), Moeara Kiawai (Ophir) (3), Medan (4), dem Batak-Gebirge (5) und vom Tanggamoes. Die *leucodira*-Rasse scheint also über ganz Sumatra verbreitet zu sein, sicherlich aber einen grossen Teil der Insel zu bewohnen. In vertikaler Hinsicht reicht sie von der Küste bis in 2100 m oder vielleicht auch darüber.

Für eine Besprechung der morphologischen Variationsbreite ist die Zahl der bisher beschriebenen Individuen nicht zureichend. Die höchsten Zahlen für die Nackenschuppen (23-25) meldet WERNER (4) für sein Material aus Medan. Die drei von mir untersuchten Exemplare zeigen hier bloss 21. Für die Rumpfmitte lauten die Zahlen 17-19. Die Ventralia scheinen ziemlich konstant zu sein u.zw. 183-191. Subcaudalia sind 38-54. Das dunkle Querband auf der Unterseite liegt im Gebiete des 18.-25. Ventrale und ist übrigens auch bei der javanischen *N. n. sputatrix* manchmal vorhanden.

VAN LIDTH DE JEUDE (3) beschreibt ein halberwachsenes Stück mit schwarzer Oberseite: "the rest of the belly and the tail black with 3 narrow light bands on the tail." Die Jugendzeichnung scheint also von jener der erwachsenen Tiere abzuweichen.

Über die Lebensweise von *N. n. leucodira* ist bisher noch gar nichts bekannt, sodass jenes von Dr. TOXOPEUS gesammelte Exemplar das erste ist, welches wenigstens in Gefangenschaft beobachtet werden konnte.

In dem geräumigen Terrarium betrug sich diese Schlange sehr scheu, was mit der Beobachtung in der Natur übereinstimmt, wie mir Dr. TOXOPEUS mitteilte. Die Schlange versuchte beim Fang ängstlich zu flüchten, richtete sich nicht auf und liess sich schliesslich ohne Gegenwehr fassen und in ein Leinwandsäckchen befördern. Auch im Käfig nahm sie während der einjährigen Beobachtung die typische, drohende Kobrastellung nur selten gegenüber Men-

schen ein, wohl aber stets gegenüber Tieren und zwar vornehmlich gegenüber ihren Nahrungstieren. Dabei liess sie ein auffallend lautes Zischen oder mehr ein tiefes Brummen hören, welches an den Ton erinnerte, den ein hohles Fass gibt, wenn man hinein spricht. Wurde ein Vogel in den Käfig gesetzt, oder eine junge Ratte (ja selbst gegenüber den kleinen, noch blinden Nestratten!), so richtete sie sich hoch auf und stiess mehrmals nacheinander drohend auf sie los, ohne jedoch tatsächlich zu beissen. Bloss ein einzigesmal tötete sie eine Ratte, ohne sie auch zu verschlingen. Vögel bliess oder brummte sie an, richtete sich vor ihnen auf, tat ihnen aber niemals etwas zu Leide. Um andere Schlangen kümmerte sie sich gar nicht. Verschiedene *Natrix*-Arten, *Dendrelaphis pictus* u.a., blieben stets unbehelligt. Eidechsen und Frösche frass sie niemals, erwachsene Ratten konnte, oder wollte sie nicht verschlingen.

Spucken, wie *N. n. sputatrix*, sah ich sie nie. Im Vergleich mit dieser Rasse betrug sie sich ruhiger, träger, langsamer und noch weniger agressiv. Die Ausbreitungsfähigkeit des Halses entspricht der von *N. n. sputatrix*, ist also wesentlich geringer als bei *N. tripudians*. Im Käfig betrug sie sich ähnlich wie die javanische *sputatrix*. Sie kroch vornehmlich abends herum, kam aber auch tagsüber aus ihrem Versteck, um sich zu sonnen. Die ihr gebotene Nahrung verschlang sie gleich, nachdem sie in den Käfig gebracht wurde, also stets bei Tag. Wie bereits erwähnt, bestand diese fast ausschliesslich aus Ratten und zwar vornehmlich aus Nestratten, worunter wir jene Lebensalter verstehen, in welchen die Ratten das Nest noch nicht verlassen. Mit jungen Ratten dagegen sind jene Tiere gemeint, welche bereits selbstständig sind, aber ± 10 cm Körperlänge nicht übersteigen. Niemals frass sie (auch die kleinen, blinden, wehrlosen Nestratten) ohne sich aufzurichten, zu zischen und mehrmals wie zum Anfall vorzuschnellen. Hatte sie aber die erste Ratte erfasst, so wurden die weiteren ohne dieses Angriffsspiel verschlungen. Von Nestratten und jungen Ratten verschlang meine *leucodira* ganz gewaltige Mengen. In der unten folgenden Übersicht sind bloss jene Zeiten angeführt, in welchen die Schlange allein im Käfig war. Von den Intervallen, in welchen einige *sputatrix* ♀♀ denselben Käfig bewohnten, um eventuell eine Kreuzung der beiden Rassen zu erzielen (was aber nicht gelang), sind die Angaben weggelassen.

Reis- und andere kleine Vögel, erwachsene Ratten, Schlangen, Eidechsen und Frösche wurden konstant geweigert, Sie wurden nicht nur nicht gefressen, sondern blieben überhaupt unbehelligt. Nur einmal verschlang meine Schlange, vielleicht irrtümlich, einen kleinen Webervogel. Von Ratten aber wurden in 124 Tagen 230 Stück verzehrt. Dies gibt in 1 Jahre die sehr belangreiche Zahl von ± 680 Ratten! Wir können daraus einigermassen ableiten, welche Bedeutung manche Schlangenarten für die Vernichtung von Ratten haben. Ab und zu wurden auch tote Ratten als Futter angenommen.

Häutung wurde in 1 Jahre 6 mal beobachtet u.zw.am 31.VII.; 19.VIII.; 12.IX.; 11.X.; 2.XII. 1934, am 28.III. und 24.V. 1935. Während die meisten Schlangen vor der Häutung eine Zeitlang keine Nahrung zu sich nehmen, liess *N. n. leucodira* der Häutung keine Fastenperiode vorausgehen.

VERBRAUCHTE NAHRUNGSMENGEN:

Datum	Anzahl verschlungene		Datum	Anzahl verschlungene	
	Nest-ratten	Junge Ratten		Nest-ratten	Junge Ratten
1 August 1934	12	—	1 Oktober 1934	7	—
7 „	3	—	6 „	2	—
9 „	—	2	8 „	—	1
11 „	13	—	10 „	—	1
15 „	—	5	12 „	12	1
18 „	13	—	13 „	3	3
19 „	—	3	14 „	—	4
21 „	7	—	17 „	—	4
30 „	10	—	18 März 1935	4	—
1 September	10	—	21 „	1	—
4 „	—	1	23 „	1	—
8 „	5	—	26 „	—	3
10 „	6	—	29 „	6	—
13 „	3	—	2 April	14	—
14 „	4	—	7 „	4	—
15 „	—	1	8 „	8	—
16 „	—	2	17 „	11	—
17 „	4	3	29 „	10	—
18 „	—	1			
19 „	2	5	2 Mai	5	3
20 „	6	—			
22 „	—	6			
25 „	—	1			
27 „	—	1			
30 „	—	1			

Am 10. Juni 1935 unterlag diese kräftige Schlange dem Biss einer grossen *Bungarus fasciatus*, die für einige Augenblicke in den Käfig gesetzt wurde.

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NOTES ON ORIENTAL *LABUS*, WITH DESCRIPTIONS OF THREE NEW SPECIES FROM JAVA

(Hym., Vespidae).

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The genus *Labus* contains about 25 species of small Eumenid wasps and is confined to the Ethiopian and Oriental regions. From the latter six species have been described, but some of these will probably prove to be invalid.

The generic characters were discussed in detail by J. BEQUAERT in his well known paper on the Vespidae of the Belgian Congo (Bull. Am. Mus. Nat. Hist., XXXIX, 1918, pp. 41 - 45). Though BEQUAERT's diagnosis of the genus *Labus* was based on the African species only, and the genotype (*L. spiniger* SAUSS. from Java) was unknown to him then, a critical study of this and other Oriental species has led me to the conclusion that the species from both regions are very closely related and that his interpretation of the genus is in every respect correct.

In 1918, BEQUAERT wrote: "Apparently, no observations have been made on the life history of any species of *Labus*". I failed to find any notes on this subject in the literature which has appeared since then. — Although I collected many specimens in the last few years, I did not succeed in finding a nest. This fact, together with the shape of the mandibles of these wasps, seem to point to the possibility, that their nests do not consist of cells of clay as is the case in many other Eumenid wasps. Perhaps they breed in the hollow stems of grasses or other herbaceous plants.

The wasps are usually found flying close above the ground in open and sunny spaces. They visit the flowers of different kinds of weeds, among others some small Rubiaceae. In Java they have been collected in the plains as well as in the mountains, up to about 900 m above sea-level.

The present paper is the result of a study of the Javan species of *Labus*. In order to find out, which of these had already been described, the descriptions of the existing species were consulted. This gave me the assurance that two of the Javan species are new and that a third one, if not new, has been described under a preoccupied name. Moreover I discovered that our knowledge of the Oriental species is as yet very scanty, and that a critical examination of the type specimens will be necessary to obtain certainty regarding their identity and synonymy. As I shall personally not be able to do this work in the near future, it may be advisable to publish here a number of notes accumulated while studying the existing descriptions. Though incomplete, they may be of value to other students of this genus.

A. Notes on Oriental *Labus*-species.

1. **Labus exiguus** (SAUSS.) and **L. humbertianus** SAUSS.

As is pointed out by C. DOVER (Jl. As. Soc. Bengal, 20, 1925, p. 291), the species described by H. DE SAUSSURE as *Eumenes exigua* (Et. fam. Vesp., Suppl., 1854, p. 150, type locality: "les Indes Orientales") certainly belongs to the genus *Labus*. In his opinion it should prove to be identical with *L. humbertianus* SAUSS. (Reise der Novara, Zool. II, Hym., 1867, p. 4, pl. 1, fig. 2). From a comparison of the original descriptions however, the correctness of this statement would seem very doubtful. Attention may be drawn to the following characters of *"Eumenes exigua":* "Pétiole sans renflement, s'élargissant un peu d'avant en arrière, puis tronqué droit à son articulation..... Deuxième segment en forme de cloche, mais très court, sensiblement plus large que long". The petiole of *L. humbertianus* is described as follows: "Petiolus basi gracilis, postice latior et gibbosus, basi supra tuberculatus, apice ante marginem constrictus". The second abdominal segment of this species should be even longer than in *L. spiniger* (compare p. 165 of this paper!). The differences are obvious and in my opinion a study of the types will be necessary in order to decide whether these species are really identical.

BINGHAM's descriptions of *Eumenes exigua* (Fauna of British India, Hym. I, 1897, p. 348) and *Labus humbertianus* (l.c., p. 349) differ considerably from the original diagnoses of these species, and I think it very probable, that both his interpretations of DE SAUSSURE's species are incorrect [1]). The main differences are as follows:

Eumenes exigua SAUSS.	*Eumenes exigua* SAUSS. (sec. BINGHAM).
"Pétiole sans renflement, s'élargissant un peu d'avant en arrière. Ecaille rousse. Pattes ferrugineuses, avec les hanches, les cuisses et le milieu des tibias, noirs".	"Petiole long, clavate. Margins of the tegulae yellow. Legs black, the anterior and intermediate tibiae and tarsi above, a spot at the base of each posterior tibia above, yellow".

Furthermore, from the original description may be concluded that the scutellum of the type is entirely black, whereas *E. exigua* (SAUSS.) BINGH. is stated to have two yellow spots on the apex of the scutellum.

Labus humbertianus SAUSS.	*Labus humbertianus* SAUSS. (sec. BINGHAM).
"Maculis 2 tegularum marginis luteis. Pedes fuscescentes, genubus et tarsis plerumque ferruginescentibus".	"Tegulae yellow. Legs black, posterior tibiae at the base yellow. (Var. ♀: the tibiae of all the legs above yellow)".

[1]) Apparently, MEADE-WALDO and DOVER did not see the types of DE SAUSSURE and were both misled by the incorrect determinations of BINGHAM.

According to BINGHAM, the lateral angles of the scutellum are yellow, but this character is not mentioned in DE SAUSSURE's description, and it seems very improbable, that this might be due to an oversight of the latter author.

It must be stipulated here, that the coloration, though usually of only secondary value in distinguishing the species in the Vespidae, appears to be fairly constant in the *Labus*-species. Therefore the above mentioned differences may be regarded as sufficiently important to indicate the necessity of a revision of the Indian species.

2. **Labus armatus** CAM.

P. CAMERON described the ♂ of this species from the Khasia Hills (Ann. Mag. Nat. Hist. (7), 6, 1900, p. 536). During a visit to the Museum in Oxford in April 1934 I had the opportunity of comparing the type in the ROTHNEY-collection with *Labus*-specimens from Java. There can be but little doubt, that this species is identical with *L. amoenus* n.sp., described on p. 162 of this paper. In any case, the name *armatus* may not be used for this species, as it is pre-occupied by *Labus armatus* (GRIB.) (*Stroudia armata* GRIBODO, Bull. Soc. ent. Ital., XXIII, 1891, p. 264).

3. **Labus interstitialis** (CAM.).

Described by P. CAMERON as *Zethus interstitialis* (Jl. Bombay Soc. Nat. Hist., 14, 1902, p. 191) and correctly placed in the genus *Labus* by G. MEADE-WALDO (Ann. Mag. Nat. Hist. (8), 14, 1914, p. 404). This appears to be a valid species. It is easily distinguished from the other Oriental species (also from *L. exiguus* (SAUSS.) ?) by the unarmed postscutellum.

4. **Labus punctatus** MEADE-WALDO (Ann. Mag. Nat. Hist. (8), 5, 1910, p. 37 ♂, Kangra Valley, Punjab).

Differs from the other Oriental species in having the postscutellum "sharply raised to form two teeth".

I should like to draw attention to the fact that the description of *L. punctatus* agrees in many respects with that of *"Eumenes exigua"* SAUSS. 1854. Both species show the absence of yellow on the scutellum and the tegulae, and both are said to have the whole petiole coarsely punctate and the legs partly ferruginous. Unfortunately, DE SAUSSURE does not describe the shape of the post-scutellum. The only striking difference between the descriptions is that the clypeus of *E. exigua* is yellow, whereas in *L. punctatus* it is black. Before the resemblance between the two descriptions had occurred to me, I saw the type of *L. punctatus* in the British Museum and made the following note about it: "The type is a female from Kangra Valley". Not until sometime afterwards did I notice that the species is described as a ♂, not only by MEADE-WALDO, but also by J. BEQUAERT (Ann. Mag. Nat. Hist. (10), 2, 1928, p. 150). This being the case I feel some doubts as to whether my note is really correct. If the type of MEADE-WALDO's species should indeed prove to be a ♀, the difference in the coloration of the clypeus might possibly be a secondary sexual character

such as is commonly found in the Vespidae. Even in that case the question of the probable identity of these two species can only be solved with certainty by a comparison with the type of *Eumenes exigua* SAUSS.

B. The *Labus*-species of Java.

Up to the present, only one species of *Labus* was known from Java, viz. *Labus spiniger* SAUSS., the ♂ of which had been described from Batavia. In my collection there are three species from this island, and I found some specimens of a fourth one in the "Rijks Museum van Natuurlijke Historie" in Leiden (Holland). Two of these species are fairly common (*L. spiniger* and *L. amoenus* n.sp.); they are generally confused in collections under the name *spiniger*. I saw specimens of *L. amoenus*, named as *L. spiniger* by DU BUYSSON (Museum Leiden, Holland) and by F. F. KOHL (Museum Vienna) [1].

In order to avoid undue repetition, it may be stated here that the four species described below have the following characters in common.

Head subcircular in front, as seen from above much wider than the anterior margin of the thorax. Clypeus convex, somewhat longer than wide at the base, median portion more or less produced, its apex emarginate and bidentate, laterally with bluntly projecting angles. Mandibles short, obliquely truncate at their apex; folded over each other and, when closed, for the most part hidden underneath the anterior margin of the clypeus; their apex tridentate in the ♂, quadridentate in the ♀, their outer surface with longitudinal grooves. Antennae 12-jointed in the ♀, 13-jointed in the ♂, rather short, somewhat thickened towards the apex; the third joint scarcely longer than the fourth; in the ♂ the terminal joint recurved as a hook at the underside of the 11th joint, the 12th joint very short.

Thorax elongate. Pronotum more or less narrowed towards its anterior margin, which is feebly sinuate and laterally carinate; the sides with a vertical carina which forms the anterior margin of a vertical elongate impression; lateral angles sharp and projecting more or less outwards. Mesonotum longer than wide, without distinct parapsidal furrows. Mesopleurae strongly convex, without sutures or carinae. Scutellum feebly convex, with a slightly raised transverse area in the middle, which bears two yellow or whitish spots. Postscutellum with a short, tooth-like, tubercle in the middle. Propodeum rather short, with a distinct median longitudinal furrow; its sides rounded, without carinae; much narrowed and gradually sloping towards the apex, where it is deeply emarginate and ends on each side in a projecting lamella.

Legs rather short and thin, claws bifid at their apex. Middle femora in the ♂ more or less dilated at the base and finely pubescent beneath (fig. 1, *e*). Posterior coxae (fig. 1, *d*) in both sexes with a curved and bluntly projecting carina at their posterior face [2].

[1] Two *Labus*-specimens were kindly sent to me by Dr. F. MAIDL.

[2] This character has apparently been overlooked by the previous authors. It would be interesting to know whether it is present in all *Labus*-species.

Wing venation: fig. 1, *c*. The second cubital cell trapezoidal, usually longer than high, much narrowed towards the radial cell, where it is closed or nearly so; the first recurrent nervure is almost the straight continuation of the inferior margin of the second cubital cell; the first cubital cell is longer than both the second and third cubital cells together. Radial cell broad, rounded or roundly truncate at its apex, often with a trace of an appendiculate vein.

Abdomen long and slender. Its first segment narrowed into a petiole which, when seen from above, widens rather gradually from base to apex. When seen in profile, the sides of the basal part are nearly parallel, the apical part is distinctly swollen above. The petiole is slightly shorter than the thorax (including the propodeum with the apical lamellae). Its dorsal face has a transverse depression in front of its apical margin, followed by a terminal swollen rounded ridge. Second segment shorter than the first, constricted at the base into a very short neck which is much narrower than the apex of the first segment, thence bell-shaped with a duplicated terminal margin; its preapical swollen transverse portion bordered by a row of fine punctures. The following segments are much narrower and often more or less retracted into the second segment.

Head and thorax rather dull, microscopically sculptured and more or less densely punctate, the fovea on the vertex impunctate. Horizontal face of the propodeum somewhat shiny, the sides dull, with fine and irregular sculpture. Abdomen moderately shiny, basal part of the petiole coarsely punctate and rugose, apical part as a rule with some scattered punctures which are less deep than those of the thorax. Puncturation of the second segment finer and more superficial than that of the thorax, often nearly absent; the following segments impunctate.

The body is covered with an extremely fine and short silvery pubescence, which is densest on the face and on the propodeum.

The following key may serve to distinguish the species occurring on Java.

1. Markings yellow. Mesopleurae wholly black [1] 2
— Markings whitish or white. Mesopleurae with a whitish spot beneath the tegulae 3
2. Head, when seen in front, slightly longer than wide, its sides somewhat flattened. Anterior angles of pronotum projecting strongly outwards. The raised area of the scutellum with slightly projecting posterior angles. Abdominal petiole long and slender (fig. 1, *a*) *L. amoenus* nov. spec.
— Head approximately as long as wide, its sides rounded. Anterior angles of pronotum projecting only slightly. Median area of scutellum rounded posteriorly. Abdominal petiole shorter (fig. 1, *g*) *L. angularis* nov. spec.
3. Posterior excavation of propodeum margined above; in profile, a small tooth is visible above the lamella (usually somewhat hidden by the pubes-

[1]) For reasons of convenience I use a colour character, which appears to be constant for the Javan representatives of this genus. This does not preclude, however, that it might prove to be variable if specimens from other islands were taken into consideration.

cence). Anterior margin of clypeus: fig. 1, *k*. Abdominal petiole rather stout (fig. 1, *j*) *L. spiniger* SAUSS.

— Posterior excavation of propodeum not margined above (fig. 1, *l*). Anterior margin of the clypeus less produced than in the preceding species (fig. 1, *m*). Abdominal petiole slender (fig. 1, *l*) *L. clypeatus* nov. spec.

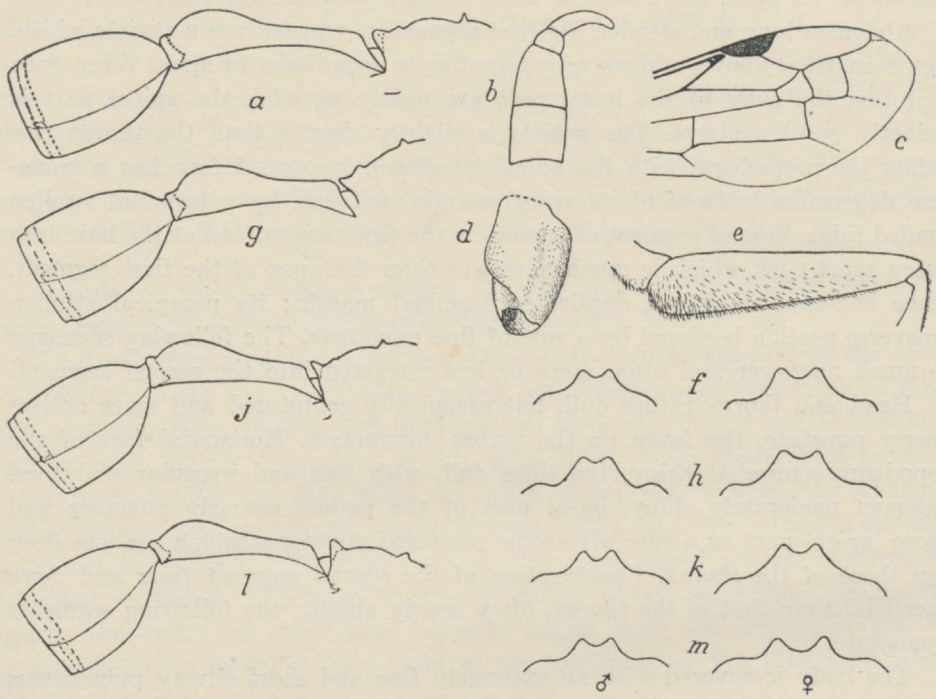


Fig. 1. — *a-f Labus amoenus*, n.sp.: *a* part of thorax and abdomen ♀; *b* ultimate antennal segments ♂; *c* part of front wing ♀; *d* posterior view of left coxa III; *e* posterior view of right trochanter and femur II ♂, *f* anterior margin of clypeus ♂ and ♀. — *g-h Labus angularis*, n.sp.: *g* part of thorax and abdomen ♀; *h* anterior margin of clypeus ♂ and ♀. — *j-m Labus spiniger* SAUSS.: *j* part of thorax and abdomen ♀; *k* anterior margin of clypeus ♂ and ♀. — *l-m Labus clypeatus*, n.sp.: *l* part of thorax and abdomen ♀; *m* anterior margin of clypeus ♂ and ♀.

Labus amoenus, new species.

? *Labus armatus* CAM., Ann. Mag. Nat. Hist. (7), 6, p. 536 (1900), ♂, Khasia Hills, India (nec *L. armatus* (GRIB.) Bull. Soc. Ent. Ital. XXIII, p. 264 (1891), ♀).

A relatively large species, distinguished from its allies by the shape of the head, the strong outwardly projecting tubercles of the pronotum, the shape of the scutellum and the rather dense and coarse puncturation of head and thorax.

♂ — Head thick, when seen in front slightly higher than wide, its sides somewhat flattened, frons strongly swollen. Anterior margin of clypeus: fig. 1, *f*. Interantennal shield swollen, carinate in the middle, the carina is more or less distinctly prolonged on the lower part of the frons.

Pronotum truncate anteriorly, its lateral angles sharp and projecting outwards sharply (relative widths of pronotum between and behind the tubercles

= 64: 57). Mesonotum longer than wide (62: 52). The posterior part of the scutellum presents a somewhat raised (yellow) area, with slightly divergent sides and roundly projecting posterior angles; it is divided in the middle by a triangular impression (widest at the apex) and bordered posteriorly by an almost straight row of punctures, close to the apical margin of the scutellum. Postscutellum with a rather sharp tubercle in the middle. Propodeum with a deep median furrow, its posterior excavation is margined above; as seen in profile, the margin appears as a small tooth above the apical lamella.

Abdominal petiole long and slender, nearly as long as the thorax; the swollen part about 2⅓ times as high as the linear part, the latter is as high as wide, and has about one third of the width of the terminal ridge. Second segment about ¾ as high as long, and slightly longer than wide. Relative lengths of first and second segments = 5 : 4.

Middle femora abruptly dilated at the base beneath, under side provided with fine white pubescence (fig. 1, *e*).

Wings: fig. 1, *c*. Apex of radial cell truncate, with a distinct trace of an appendiculate vein.

Head and thorax somewhat coarsely punctate, the punctures larger and deeper than in the other species, the interspaces being rarely larger than the punctures. On the lower part of the frons, and on the posterior part of the mesonotum, the punctures are partly distinctly confluent. Lateral fovea of pronotum punctate. Anterior half of scutellum coarsely and densely punctate, the raised area sparsely punctate. Dorsal area of propodeum shiny, with deep and distinct punctures, which however, are smaller than the interspaces; the sides for the most part rather dull, irregularly punctate. Linear part of petiole coarsely rugosely punctate, the swollen part shiny, with scattered fine punctures. Second tergite microscopically sculptured, sparsely covered with extremely minute and shallow puncturation, hardly visible with a handlens, the sternite somewhat more distinctly punctate.

Black. An elongate triangular spot on the mandibles, a large spot on the clypeus, narrowed towards the apex and not reaching the anterior margin, a spot on the scape beneath, a scarcely interrupted transverse fascia on the pronotum, an interrupted line along the outer margins of the tegulae, the posttegulae, two spots on the scutellum (for shape see above), the apical lamellae of the propodeum, and narrow fasciae on the apical margin of the first tergite and on the preapical margin of the second tergite and sternite, yellow. Furthermore the following are yellow: a spot at the apex of femora I, tibiae I, except a spot at their inner side, a small spot at the apex of femora II, outer side of tibiae II, and a small spot at the base of tibiae III. Preapical two or three joints of the antennae ferruginous beneath, the ultimate hook-like joint wholly ferruginous. Depressed apical margin of second segment testaceous. Tarsi brownish, metatarsus II often yellowish. Wings slightly smoky, apex of median cell and the radial cell rather strongly infuscated.

Length (h. + th. + t. 1 + 2), 7 - 8 mm.

♀ — Very similar to the male. Anterior margin of clypeus: fig. 1, *f*. Mandibles and antennal scape entirely black. Basal half of clypeus with a yellow spot which is usually trilobate and apparently never emarginate or incised in the middle. Middle femora entirely black, not dilated at the base, their pubescence shorter and less conspicuous.

Length (h. + th. + t. 1 + 2), 7 - 8½ mm.

Sumatra: 1 ♀, Lampong Districts, Pembangkok (Dr. H. R. A. MULLER leg.); Bangka: 1 ♂, Tjeloeak (author); West-Java: many specimens from the following localities: Tjilegon, Djasinga, Tjimangeunteung, Antjol near Batavia, Depok, Buitenzorg, Soekaboemi, Djampang Tengah; Middle-Java: Gedangan near Semarang (Dr. L. G. E. KALSHOVEN leg.); East-Java: Malang (Dr. J. G. BETREM leg.).

Vertical distribution: 0 - ± 900 m.

The holotype is a ♂ from Buitenzorg, the allotype is a ♀ from Djasinga (Mus. Leiden, Holland).

Labus angularis, new species.

This species resembles *L. amoenus*, but it is less slender, the thorax is flatter, the anterior angles of the pronotum project outwards only slightly, the scutellum differs in shape, the abdominal petiole is shorter, and the clypeus is slightly different in the male sex. The puncturation is somewhat finer, and there are some minor differences in the coloration.

♂ — Head slightly wider than high, somewhat flattened above, clypeus rather narrow, longer than wide at base, its median portion produced and shallowly incised in the middle, the apical teeth rather blunt (fig. 1, *h*).

Lateral angles of pronotum projecting very slightly (relative widths of pronotum between and behind the angles 62: 60). Mesonotum flat, longer than wide (56: 50). Scutellum slightly convex, posteriorly with a narrow and rather shallow median groove; posterior angles rounded, not projecting. Tubercle of postscutellum roughly as acute as in *L. spiniger*. Median furrow of propodeum rather shallow, posterior excavation distinctly margined above.

Abdominal petiole more or less intermediate between *L. spiniger* and *L. clypeatus*, distinctly shorter than in *L. amoenus*. It is about 8 times as long as wide behind the base, the linear part is relatively short, about as high as wide, and ⅓ as wide as the terminal ridge, the posterior part widens gradually and is slightly more than twice as high as the linear part. Relative lengths of first and second segments = 10: 9. Second segment ¾ as high as long, distinctly longer than wide, its sides very gradually rounded from the narrow base to the middle.

Middle femora slightly dilated at the base beneath, forming a bluntly rounded angle, pubescence less conspicuous than in *L. amoenus*.

Wings normal, radial cell roundly truncate, appendiculate vein apparently sometimes indistinct.

Puncturation about the same as in *L. spiniger.*

Black; differs from *L. amoenus* in coloration as follows: spot on mandibles larger; the clypeus is almost entirely yellow, its anterior margin showing an extremely narrow black border which is dilated near the eyes, the yellow spot is pear-shaped, slightly emarginate at the apex. Scape beneath with a yellow line, which nearly reaches the apex. The fascia on the pronotum has about the same shape as in *L. amoenus*, but is slightly wider. Yellow margin of tegulae wide, not interrupted. Spots on scutellum oval, not angular as in *L. amoenus.* Legs as in *L. amoenus*, but femora II entirely black, tarsi all brownish black.

Length (h. + th. + t. 1 + 2), 6½ - 7 mm.

♀ — Anterior margin of clypeus similar to that of *L. amoenus* (fig. 1, *h*). The spot on the clypeus is oval, somewhat wider than long, it occupies nearly ⅔ of the clypeus, the apical third and a part of the sides being black. Antennal scape with a short yellow line at the base. Otherwise as in the ♂.

Length (h. + th. + t. 1 + 2), 7 - 8 mm.

West-Java: 1 ♂, Tapos on Mt. Gedeh, 700 m, Aug. 1933 (holotype); 1 ♂, idem (paratype); 1 ♀, idem (allotype); 1 ♀, Tjiboerial near Buitenzorg; 240 m, April 1932 (paratype).

Holotype and allotype in Museum Leiden, Holland; paratypes in my collection.

Labus spiniger SAUSS.

1867. SAUSSURE, H. DE, Reise der Novara, Zool. II, Hymenoptera, p. 4, no. 1, Taf. 1, Fig. 1, 1a—d.

1907. KOHL, F. F., Denkschr. k. Akad. Wiss. Wien, math. naturw. Kl., LXXI, 1, p. 242.

?1914. SCHULTHESS, A. VON, Zool. Jahrb. Syst., 37, p. 262.

Less slender than *L. amoenus*, head more rounded, tubercles of pronotum less projecting, shape and puncturation of scutellum different, puncturation of head and thorax finer. Abdominal petiole rather thick. Markings yellowish white.

♂ — Head thick, slightly wider than long, its sides rounded. Anterior margin of clypeus: fig. 1, *k*. Interantennal shield bluntly carinate; frons convex, not carinate.

Thorax shorter than in *L. amoenus*, lateral angles of pronotum moderately projecting (relative widths of pronotum between and behind the tubercles 62: 58). Mesonotum relatively shorter (60: 55). Scutellum hardly convex, its posterior margin narrowly depressed, in front of it, between the two whitish spots, there is a rather wide median longitudinal groove which is much narrowed and often only indicated on the basal half of the scutellum. Posterior angles rounded, not projecting. Spine of postscutellum blunt. Median furrow of propodeum distinct, posterior excavation margined above, the margin, however, less raised than in *L. amoenus.*

Abdominal petiole rather short and stout, the swollen part less than twice as high as the linear part, the apical rim is less than three times as wide as the linear part of the petiole, which is slightly higher than wide. Second segment

short, seen from above scarcely longer than wide (44: 42) and in profile about $^5/_6$ as high as long. The shape of this segment appears to be somewhat variable, but it is always distinctly shorter, higher and wider than in *L. amoenus*.

Middle femora only slightly dilated at the base, pubescence sparser and shorter than in *L. amoenus*.

Wings normal. Apex of radial cell truncate, even more distinctly so than in *L. amoenus;* trace of appendiculate vein very conspicuous.

Puncturation of head and thorax somewhat finer than in *L. amoenus,* many interspaces being as large as or even larger than the punctures. Punctures on lower part of frons and on mesonotum not confluent. Lateral fovea of pronotum with a few punctures. Punctures on basal half of scutellum rather fine and smaller than the interspaces. Dorsal area of propodeum very sparsely punctate, the sides dull and rather densely irregularly punctate except at the apex. Sculpture of abdomen about the same as in *L. amoenus,* linear part of petiole very coarsely rugose.

Black, differs from *L. amoenus* in coloration as follows: Colour of the markings very pale yellow or yellowish white. Clypeus almost entirely pale yellow, anterior margin hardly black. Scape of antennae black or with only a small spot at the base, tenth joint black, eleventh joint brownish beneath, the two extreme joints ferruginous brown. Pronotum with two transverse spots, separated by a distance which is about $^1/_3$ of the width of the pronotum. In some specimens the spots are somewhat larger, but they never form a scarcely interrupted fascia. Mesopleurae with a distinct spot beneath the tegulae. Outer margin of tegulae yellowish white, very rarely interrupted. Scutellum with two transverse oval spots which are rounded posteriorly, not straight as in *L. amoenus*. Femora I with a small spot at the apex (in one small specimen nearly absent), II and III wholly black, inner side of tibiae I black; tarsi, including the metatarsus II, dark brown. Wings as in *L. amoenus*.

Length (h. + th. + t. 1 + 2), 6½ - 7½ mm.

♀ — Very similar to the male. Anterior margin of clypeus: fig. 1, *k*. Basal third of clypeus with an arcuate transverse line, which is broadly, and more or less deeply, emarginate anteriorly. Mandibles and antennae black. Second abdominal segment slightly longer than in the ♂.

Length (h. + th. + t. 1 + 2), 6½ - 7½ mm.

West-Java: Batavia (Novara-Reise, DE SAUSSURE, 1867; 1 ♂, Dr. H. KARNY leg. in Mus. Buitenzorg), Koeripan, Buitenzorg, Tapos (on Mount Gedeh, 700 - 800 m, many specimens in my collection), Mount Tjisoeroe (Djampang Tengah, 1 ♂, Mrs. E. WALSH leg. in Mus. Buitenzorg), Soekanegara; East-Java: Malang (Dr. J. G. BETREM leg.).

Vertical distribution: plains — ± 900 m.

Labus clypeatus, new species.

This species approximates very closely to *L. spiniger* SAUSS., so that it will be sufficient to point out the chief differences.

♂ — Clypeus somewhat shorter, the median portion less produced, its teeth slightly blunter. Groove on the scutellum superficial and very short, not visible on the basal half. Spine of postscutellum somewhat blunter. Posterior excavation of propodeum not margined above; apical lamellae sharp (fig. 1, *l*). Abdominal petiole slender, more than nine times as long as wide behind the base, terminal ridge more than three times as wide as the basal linear part, the latter about as high as wide. The convex part is more gradually swollen than in *L. spiniger* and about ⅔ times as high as the linear part. Second abdominal segment slightly longer in proportion to its width. Middle femora dilated at the base, bluntly angular beneath.

Puncturation about the same as in *L. spiniger*, linear part of petiole less coarsely sculptured, the swollen part with only a few very fine punctures.

The markings are scarcely less pale than in *L. spiniger*, but somewhat more extensive. Clypeus almost entirely pale yellow, anterior black margin extremely narrow. Basal three fourths of the antennal scape with a yellowish line beneath. Anterior margin of pronotum with a transverse fascia, which is interrupted over one fifth of its width. Spot on mesopleurae beneath the tegulae larger than in *L. spiniger*. Yellowish line along outer margin of tegulae interrupted (probably variable, compare description of ♀!). Femora I and II with a pale yellow spot at the apex, femora III brownish at the end, tibiae I yellowish, with a dark line on their inner side, tibiae II and basal half of tibiae III with a yellowish line at their outer side. Tarsi dark brown.

Length (h. + th. + t. 1+ 2), 7 mm.

♀ — Differs from the ♂ as follows. Anterior margin of clypeus: fig. 1, *m*. Base of clypeus with a broadly emarginate transverse yellowish line as in *L. spiniger*. Mandibles black, brownish at the apex. Yellowish line along outer margin of tegulae entire. Middle femora black, their extreme apex ferruginous.

Length (h. + th. + t. 1 + 2), 7½ mm.

Middle-Java: 1 ♂, 1 ♀, Semarang, 1905, (resp. holotype and allotype), EDW. JACOBSON leg. (Mus. Leiden, Holland). In 1934 I saw two other specimens from the same locality and date in this Museum.

ON THE GENUS *TOXODERA* SERV., WITH A DESCRIPTION OF *TOXODERA MACULATA* OUWENS, FROM JAVA (Orth., Mantodea).

By

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(Zoölogisch Museum, Buitenzorg).

In 1913, the late Major P. A. OUWENS, in "De Tropische Natuur", 2, p. 122, published a short article entitled: "Eenige weinig bekende Mantis of roofsprinkhanen van Java". In this paper the author enumerates the chief characters of the highly aberrant Mantid genus *Toxodera* (= *Toxodera* + *Paratoxodera* of the present paper), followed by some explanatory remarks on the four different insects united on a coloured plate which accompanies Mr. OUWENS's paper.

Although OUWENS was not an expert in entomology, nor even had any special knowledge of certain orders or groups of insects, he had what we may call the gift of drawing one's attention to something peculiar in nature, occasionally pointing out some of the numerous unusual and striking features that a student is liable to meet sooner or later when engaged in the study of tropical insects, and other animals.

Now, on the above mentioned plate, the reader will find beautiful coloured drawings of 4 *Toxoderinae*, designated by OUWENS by the following names:

Fig. 1. *Toxodera denticulata* AUD. SERV.
— 2. — *gigas* OUWENS.
— 3. — *cornicollis*.
— 4. — *maculata* OUWENS.

These drawings, executed by a native Museum artist, are very excellent, being in fact the best reproductions of these strange-looking insects that have ever been published. Whilst going over the rich material of *Toxoderinae* as represented in the Buitenzorg Museum collection, I found it quite easy to correctly determine the "plastotypes" discussed by OUWENS, and although the animals themselves, with the sole exception of *Paratoxodera cornicollis*, have been completely destroyed and must be considered as lost, these water-colour drawings are easily interpreted:

Fig. 1 is the type of *Toxodera integrifolia* WERNER, described by that author in Treubia, 6, 1925, p. 485 - 486. A photograph of OUWENS's specimen is reproduced on pl. 24 fig. 3 of the said paper. The specimen is lost.

Fig. 2 is a young individual (larva) of *Toxodera denticulata* SERV., as was pointed out already by WERNER in the above mentioned paper (l.c. p. 486). This example is likewise destroyed.

Fig. 3 is a specimen of *Paratoxodera cornicollis* WOOD-MASON, which is still in the collection of the Buitenzorg Museum.

Fig. 4, lastly, is *Toxodera maculata* OUWENS, the principal object of this paper. As will be shown in the next pages, this is a good species which needs elucidation, for the type is no more in existance.

In "De Tropische Natuur" 12, 1923, H. H. KARNY published an article entitled: "Over een merkwaardigen bidsprinkhaan", in which OUWENS's opinion is critisized, and *T. gigas* as well as our *T. maculata* are both referred to *denticulata*. With regard to *T. gigas*, KARNY was right, but his arguments in favour of considering *maculata* as an individual aberration of *denticulata* are neither justified nor sound. His remarks: ".....Het is dus ten eenenmale onmogelijk om alleen naar aanleiding van een kleurkenmerk een aparte soort op te stellen, en daar *maculata* overigens in alle eigenschappen met *denticulata* overeenkomt, houden wij ook haar voor identiek met deze soort" (loc. cit. p. 67) have now proved to be entirely wrong, for *T. maculata* is easily distinguished from *denticulata* by a number of characters.

The error is perpetuated in Prof. WERNER's "Vierter Beitrag zur Mantodeenfauna von Niederländisch-Indien" (Treubia, 6, 1925), where *Toxodera maculata* is also placed as a synonym of *denticulata* SERV., but the author abstained from giving his own opinion on the subject. The photograph on pl. 24 fig. 3 (right insect) of WERNER's "Beitrag" is clearly *maculata* and not *denticulata*, as will appear from the following notes. This photograph in all probability was taken from OUWENS's type specimen.

Lastly, in BEIER's recent catalogue of the *Toxoderinae* (Gen. Ins., 198, 1934), *T. maculata* is again mentioned as a synonym of *denticulata* without further comments, but this is obviously based on WERNER's authority.

A few years ago I was fortunate enough to receive a living specimen of the true *Toxodera maculata* OUWENS, from near Tjibadak, West Java. The insect arrived in good condition and was kept alive in a large cage for twelve days in succession. Immediately after its arrival an abundant supply of food, consisting of all kinds of small insects, was brought into the cage, but the Mantid remained quite inert and unconscious of any movement around it; the last day before its death it fell to the bottom of the cage and, in an unguarded moment, was attacked by a number of small red ants, which, unfortunately, devoured part of the anal segments of the abdomen before the specimen was saved.

It is obvious that OUWENS's "description" of this rare insect is extremely poor and insignificant:

> "Fig. 4 is de afbeelding van *Toxodera maculata*, zoo door mij genoemd, omdat zij zich van *Toxodera cornicollis* niet alleen door het gemis van hoorntjes op den prothorax en het gebogen zijn van dit lichaamsdeel onderscheidt, maar ook omdat de bovenvleugels van deze soort sterk gevlekt zijn."

From this description alone *maculata* would never have been recognized as a distinct species, the more so as OUWENS did not compare it with *T. denticulata*, but the fine drawing of his animal is abundantly sufficient to distinguish *maculata* at once from the other known species of *Toxodera*.

For the reception of *T. cornicollis*, to which *maculata* bears a very striking resemblance, WOOD-MASON erected the genus *Paratoxodera*. However, on account of the curved pronotum and the strongly developed cerci, which are distinctly excavated at tip, *maculata* should be placed in the genus *Toxodera*.

The following is a re-description of the second specimen known.

Toxodera maculata OUWENS.

1913. OUWENS, De Trop. Natuur, 2, p. 123, pl. fig. 4. — „Java".
1923. KARNY, Idem, 12, p. 67. — Notes (*T. denticulata* SERV., *pars*!)
1925. WERNER, Treubia, 6, p. 486, pl. 24 fig. 3 (right insect). — Java (*T. denticulata* SERV., *pars*!)
1934. BEIER, in WYTSMAN, Genera Insect., fasc. 198, p. 8 (*T. denticulata* SERV. *pars*!)

Material examined: — One specimen (sex?), W. Java, Tjibadak, 800 m alt., Sinagar Est., March 17, 1931 (alive), Mrs. ERMELING misit. — The specimen is the p l e s i o t y p e, in Mus. Buitenzorg.

H e a d small trigonal, broader than deep; labrum, palpi and clypeus pale straw-coloured, frons and vertex blackish-brown. Labrum smooth, clypeus with two transverse ridges in front and one median, trapezoidal tubercle placed behind. Frons with a transverse median tubercle, which is hollowed out and bitubercular when seen from behind. Vertex elevated, trapezoidal, ocelli placed in a triangle at margin. Occiput rounded behind, brownish-yellow in colour, with four rather deep longitudinal depressions above. Eyes produced, acutely mammiform, more obliquely placed than in *T. pluto* with the points directed more

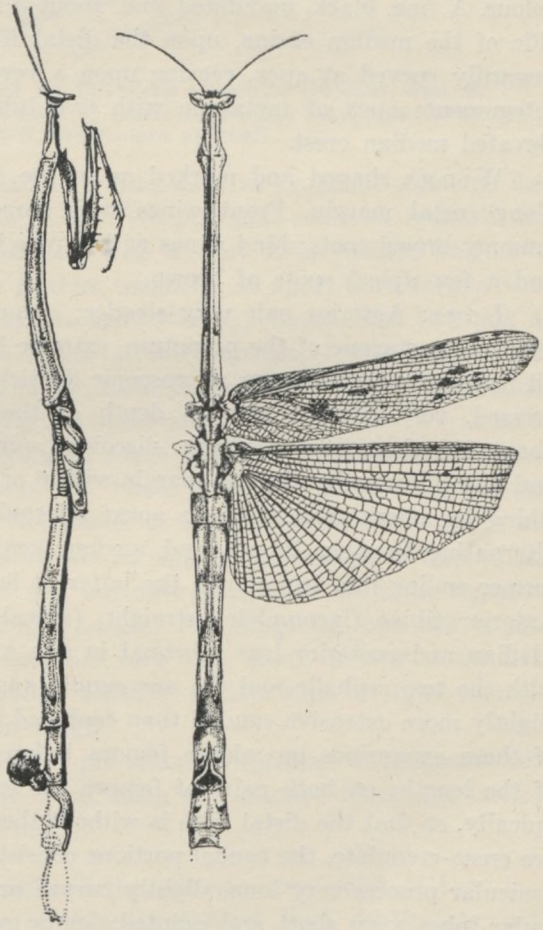


Fig. 1. — *Toxodera maculata* OUWENS. (Slightly reduced).

upwards, but very much shorter and less pointed than in *T. denticulata*. Antennae pale yellow (incomplete), simple.

Pronotum very long and slender, three times longer than the anterior femora; prozone 6½ times shorter than the metazone; supra-coxal dilatation moderate. Prozone dirty yellowish, straight in profile view, widened apically; lateral margins provided with numerous small denticles of equal size. Dorsal surface convex, with a fine median longitudinal ridge over the entire length, on each side of which runs a second, slightly thicker ridge, terminating before the end of the prozone; the distal third with a second pair of incomplete ridges, one on each side of the median carina and ending before the middle of the prozone. Metazone pointed-triangular in cross-section, acutely ridged dorsally, very slightly bent in profile view; median and lateral carinae with microscopic denticles along their entire length, lacking any tubercles; surface rather smooth, with very irregularly placed microscopic denticles; basal sixth dirty yellow, then fading to brownish towards the middle, and finally greyish-yellow in colour. A fine, black, undulated line, about 5 mm in length, is placed on either side of the median carina, upon the distal fifth of the metazone; this line is inwardly curved at apex, ceasing upon a very low tubercular swelling of the integument; apex of metazone with two tubercles, one on each side of the elevated median crest.

Wings shaped and marked as in the figure; membrane hyaline except along costal margin. Front wings with three groups of very distinct, dark mummy-brown spots; hind wings with a pale brown streak along costal margin and a few apical spots of brown.

Legs: Anterior pair very slender; coxae slightly less than one-third the length of metazone of the pronotum, extreme base with two short spines below, all margins with numerous microscopic denticles; femora slightly arcuate, compressed, very slender, greatest depth at the proximal fourth and contained about 6½ times in the length, discoidal spines placed at the greatest depth and 2 or 3 in number, lateral margin with 6 or 7 regularly placed spines, diminishing in length from base to apex, internal margin with 13 spines of two alternating lengths; lateral and median genicular lobes well developed, the former ending into two spines, the latter at least three times longer, spiniform. Anterior tibiae (incomplete) straight, (apical claws wanting; tarsi wanting). Median and posterior legs subequal in size and very similar in form; femora with the two cephalic and the one caudal angle bearing foliaceous expansions, slightly more extensive caudad than cephalad on middle femora; greatest width of these expansions on middle femora before, on posterior femora at middle of the length; on both pairs of femora the expansions are suddenly narrowed apically, so that the distal fifth is without them; the margins of the expansions are eroso-crenulate, the caudal portions consisting of two distinct parts; median genicular process very long, slightly curved and acutely spiniform, lateral genicular lobes very short and pointed; spurs extremely slender, equal in length to the median genicular process. Tibiae very slender, sub-setiform, unspined

except the terminal setae, which are unequal in length; middle tibia almost straight, posterior tibia distinctly curved. Metatarsi slightly less than a third of the length of tibiae. Colour pale brownish-yellow, marked with dark blackish-brown on the femora, as is shown in fig 1.

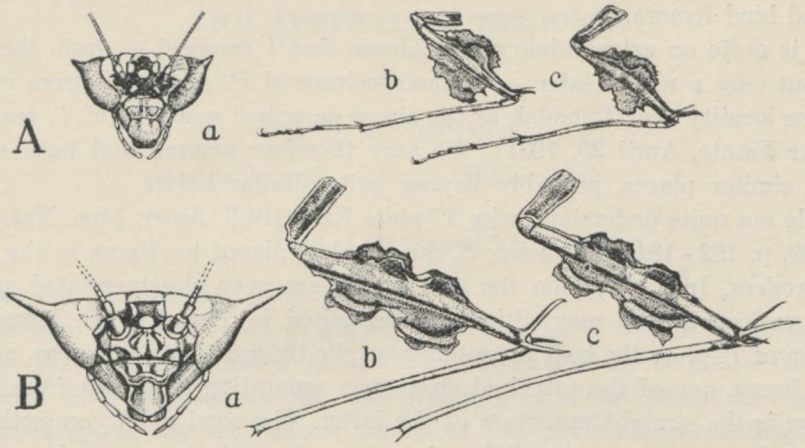


Fig. 2. — Structural details of A, *Toxodera maculata* OUWENS, and B, *T. denticulata* SERV. a, frontal view of head; b, median leg; c, posterior leg. (Tarsi of *T. denticulata* omitted).

A b d o m e n elongate, subequal in width, the five proximal segments distinctly longitudinal; apical margin of the five proximal sternites rounded and only very little produced at middle, each with a short distal median keel; 1 - 2 tergite with very small triangular median tonguelet at apex, third tergite with two small and narrow foliaceous blades bent over the dorsum and reaching as far cephalad as one-fourth of the length of this segment; fourth tergite with a high foliaceous structure placed in the form of an inverted V on the caudal section and about two-thirds as high as the segment is long; the two sides of this structure unite on their converging edges and bear a foliaceous median lappet which is strongly turned over and whose upper margin is much eroded, bearing slender filaments at apex. Remainder of segments only partly preserved. In OUWENS's figure the fifth tergite bears an appendage similar to that of the fourth segment but much smaller and narrower; the sixth to ninth segments are transverse and small, without appendages. The subgenital opercule is produced and spoon-shaped and the cerci are very long, about as long as the fifth segment, lanceolate-foliaceous, greatest width at middle with the apex strongly excised, the tips being unequal in length.

L e n g t h: body (incomplete) 115; pronotum 53 (prozone 7, metazone 46); front wing, costal margin 47; hind wing, idem 43; anterior femur 20, median femur 11.2, posterior femur 11.5 mm.

From our sketches of the head and the posterior two pairs of legs, it is obvious that *maculata* OUWENS is abundantly distinct from *denticulata*, with which it is not very closely related. As stated before, *T. maculata* bears a

striking superficial resemblance to *Paratoxodera cornicollis*, from which it differs, apart from the generic characters, by the much less pointed eyes, the absence of apical foliaceous processes of the first to third abdominal sternites, the different wing-markings and the entirely different configuration of the mid and hind femora.

It is quite an extraordinary coincidence that I received — from the same lady, but only a month later — a fine specimen of *P. cornicollis* from exactly the same locality near Tjibadak as the above described specimen of *T. maculata* (Sinagar Estate, April 25, 1931). We may therefore assume that both species live in similar places, probably having quite similar habits.

I do not quite understand why *T. pluto* REHN (Bull. Amer. Mus. Nat. Hist., 26, 1909, p. 182 - 184; Benkoelen, S. Sumatra) is placed by BEIER in the genus *Paratoxodera*. In my opinion the two genera are very closely related and all of the various species may ultimately be united in *Toxodera*. In REHN's description of *T. pluto* the bent pronotum is explicitly mentioned, whereas, according to BEIER, one of the principal characters separating *Toxodera* from *Paratoxodera* is the straight pronotum of the latter. The cerci of *P. cornicollis* and *T. pluto*, however, are quite different in form from the common shape found in such species as *T. denticulata, integrifolia* and *maculata*. I am inclined to consider the shape and length of the cerci in the *Toxoderinae* as of specific importance, rather than to ascribe generic value to the structure of these organs.

NEW AND LITTLE KNOWN *ODONATA* OF THE ORIENTAL AND AUSTRALIAN REGIONS.

By

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Fam. LIBELLAGINIDAE.

Rhinocypha phantasma, sp. n.

Material examined: — 3 ♂, 2 ♀ (ad.), S.E. Celebes, Boeton I., Dwaalbaai, Jan. 19, 1917, native collector (ex coll. J. LINDEMANS & D. C. GEIJSKES).

Allied to *R. monochroa* SEL. and *frontalis* SEL., but easily distinguished from these species by the curious hoar-frost like pruinescence on the dorsum of the abdominal segments.

M a l e (ad.). — Anterior surface of head shining black, without any pale markings except a blue point on either side of the clypeus, almost touching the margin of compound eye; upper parts, including the dorsal surface of the clypeus, deep velvet-black, with no other pale markings than 4 blue points, one on each side, just behind the posterior ocelli, and one on each side upon the middle of the occipital lobes. Rear of the head pruinose white.

Prothorax black with an oval bluish spot on either side anteriorly, placed in the long axis, and a blue lateral point below posterior lobe. Synthorax black with slight bronzy reflections above. Sides with a continuous, irregular, bright blue fascia over the stigma; this band begins immediately above the coxae of middle pair of legs, forming a small triangular point in the lower corner of the mesinfraepisternites; from here it continues to behind, crosses the first suture, occupying only the lower half of each mesepimerite, filling up the lower half of the metepisternites (including the spiracle), and finally covers the dorsal two-thirds of each metepimerite. Metinfraepisternites black, as is also a narrow strip along ventral border of the metepimerum. Poststernum black with a blue spot upon middle.

Legs black, not dilated; distal two-thirds of each of the middle and posterior tibiae pure white interiorly.

Wings shaped as in *frontalis* SELYS; bases, to a level of about 3 - 5 cells proximal to the nodus, tinged with yellow, the costal space being coloured thus as far out as the nodus; remainder of the membrane uniform and opaque dark brown, with blue and reddish-purple reflections on upper- and lower side of front wings, brilliantly golden and brassy on the hind wings, especially on the underside of the latter. Pterostigma black, covering 9 - 10 underlying cells.

Abdomen, dorsum black; all segments except 1 and 10, overled with a

chalky bluish-white pruinescence, which produces an effect as if the upperside of the body were similarly coloured to the sides. The intersegmental membranes and lateral carinae of all segments, as well as the bases and extremities of segm. 8 and 7 are less heavily pruinose, so that the black ground-colour is shining through on these parts. Lateral surfaces of the tergites 1 - 8 bright greenish-blue (Bremen Blue in RIDGWAY); on segm. 1 - 4 these markings cover the entire surface and are merely interrupted by the black intersegmental membranes; the distal edges of the spots on segm. 5 - 8 are progressively, though slightly, more rounded off, and the smallest spot (on 8) is rather narrow and does not reach the apical margin of the segment. Segm. 9 - 10 and apps. black. Sternites all black.

F e m a l e (ad.) — Differs from the ♂ as follows. In addition to the small yellow points on the anterior and dorsal surfaces of the head, there are two small and widely distant spots on the middle of the frons. A short yellow line along upper four-fifths of the humeral suture, and the lateral pale fascia bright yellow instead of blue. Legs entirely black.

Basal half of all wings tinged with yellow; this colour rather abruptly changing into brown so as to form a broad, dark brown band, which — in front wing — occupies the 8th to 10th *Px* promimal to *pt;* in hind wing this band covers the entire distal half of the wing, only the apical border, distal to *pt* being milky-white in colour. Tips of front wings hyaline, distal border also milky-white. Basal two-fifths of *pt* black, remainder ivory-white.

Abdomen with the mid-dorsal carinae of segm. 3 - 5 finely yellow, and with the sides also variegated with greenish-yellow. Sides of 1 with only one, of 2 - 4 each with three yellow spots: the basal one transverse, the upper one angulate and prolonged apicad, the posterior one isolated and rounded; 5 - 7 each with a triangular yellow spot along lower margin and a narrow transverse streak along base. Sternites and segm. 8 - 10 all black.

Length: ♂ abd. + app. 19, hw. 21.5 - 22; ♀ 17.5, 23.5 mm.

The male of this new species is distinguished from *frontalis* by its smaller size, by the absence of blue spots on the upper surface of frons, and by the bluish-white pruinescence on the back of the abdominal segments. *R. frontalis* further differs from our species in that the blue lateral fascia of the thorax is more extensive and distinctly forked behind, the side-spots of the abd.-segments 6 - 8 being also different in shape: cut-off obliquely and rather pointed to behind; moreover, the 9th segment bears an additional blue side-spot in the ♂ of *frontalis,* whereas in *phantasma* this segment is entirely black.

Rhinocypha frontalis SELYS.

1873. SELYS, 3me Add. Syn. Calopt. p. 26 - 27 sep. — ♂♀ "Moluques"; Menado (N. Celebes).

1916. RIS, Entom. Mitteil. 5, p. 311 (key), 312 - 313 (descr. and full references). — ♂♀ N. and C. Celebes).

As hinted at by RIS (loc. cit.), the occurrence of this species in the Moluccas and the Philippines (LUZON) needs confirmation.

Material examined: — 1 ♂ N. Celebes, Manado; 10 ♂, 5 ♀, id., Tondano, July 1933, and June 1935, C. VAN BRAEKEL leg.; 1 ♂, 1 ♀, id., Manembo, near Manado, 6 - 800 m, July 20, 1935, P. ZONDERVAN leg.; 1 ♂, 1 ♀, S.E. Celebes, Boeton I., Febr. 2, 1917 (ex coll. J. LINDEMANS & D. C. GEIJSKES).

All males agree perfectly with the original description as given by DE SELYS. The species is easily distinguished from *monochroa* by the presence of two squarish — or somewhat rounded — bright blue spots upon the middle of the frons, in front of the ocelli. Traces of a blue antehumeral stripe are usually present in the lower corner of each mesepisternite, but sometimes they are reduced so much as to be almost absent. *R. frontalis* is further distinguished from *monochroa*, and *phantasma* as well, by the forked appearance of the lateral blue fascia of the thorax, the dorsal portion of which is continued upwards between the bases of front and hind wings, covering almost the entire median space of the metepisternites.

The ♂ from Boeton differs not in any way from our specimens of N. Celebes, except in the length of the antehumeral spots, which are in the form of narrow stripes, extending over the lower two-thirds of each mesepisternite.

The ♀ differs from typical examples in that the basal third of all wings is brown instead of yellow, only the extreme bases being of a more yellowish tint; this colour gradually deepens further distad to become dark brown between nodus and pterostigma. The tips of the front wings are hyaline and milky-white as far inward as ca 6 cells proximal to *pt* while only the extreme border of the hinder pair are milky-white.

R. monochroa SELYS, of which I have seen a fine series of specimens from Central and South Celebes, though allied to *frontalis*, is doubtlessly quite distinct from that species. In Central Celebes (Tolitoli and Paloe), both species have been found, so that the areas of distribution seemingly overlap in that part of the island.

By the absence of any blue dorsal spots on the abdominal segments and by their much larger size and more elongate wings, *monochroa*, *frontalis* and *phantasma* are well distinguished from the eastern species *tincta* RAMB., and its races.

Fam. MEGAPODAGRIONIDAE.

Podolestes orientalis SELYS (fig. 1 - 2).

Chief references:

1862. SELYS, Syn. Agrion. Podagrion, p. 40 sep. — ♀ 'Malaisie'.
1886. SELYS, Rev. Syn. Agrion., p. 89 - 90 sep. (♀ only). — ♀ juv., S. Borneo, Laboean.
1889. SELYS, Ann. Mus. civ. Genova, 27, p. 479. — ♂♀ Riouw Archip. ("Kiour, résidence de Linga").
1898. KRÜGER, Stett. ent. Zeitg. 59, p. 98 - 99. — ♂♀ N.E. Sumatra.
1927. RIS, Zoöl. Meded. Leiden, 10, p. 15 - 16. — ♀ C. Sumatra, fig. 7 (wings).
1931. LAIDLAW, Journ. Fed. Mal. States Mus. 16, p .184. — ♀ Pahang, notes.
1935. LIEFTINCK, Misc. Zool. Sum. 42 - 43, p. 6. — ♂ S. Sumatra notes.

Material examined: — 1 ♂ (ad.), W. Billiton I., Tjeroetjoek, Sept. 5, 1935, F. J. KUIPER leg. — 2 ♂ (ad.), 1 ♀ (juv.), W. Borneo, Singkawang, forest-marsh near Bakoean and Tjapkala Rd., Febr. 19 & July 20, 1932 (♂♀), and Oct. 16, 1933 (♂), — 4 ♂ (ad.), S. Sumatra, southern Lampongs, Semangka Bay, Kotaägoeng, Dec. 26, 1934, AUTHOR leg.

The type of this species is a ♀ collected by E. R. WALLACE in 'Malaisie', without further indication of habitat. This specimen is still in the Brussels Museum collection. A second ♀ was described by DE SELYS in 1886 from S. Borneo, while the first notes on the male's structures appear in that author's "Odonates de Sumatra", published only few years later; these notes were compiled after an examination of specimens collected in the Riouw Archipelago; the description, however, is insignificant and no measurements were given. RIS's account of a female from Central Sumatra is very full, but the only adequate description of the ♂ of *orientalis* is found in KRÜGER's report on Sumatran *Odonata*.

Our series of specimens can be divided into two groups, which are rather different in colouring as well as in size. Recently, however, I have received a single ♂ of this species from Billiton Island, which in many respects is intermediate between our specimens of Borneo and Sumatra. Since neither complete descriptions nor drawings of the ♂ anal appendages have so far been published, the following additional notes may be of some use.

Male (W. Borneo). — Size relatively small. Head bronzy-black. Labrum, mandible-bases, anteclypeus and genae bright chrome-yellow, this colour narrowly continued upwards against the margin of compound eyes; labrum finely bordered with black. Prothorax with a broad transverse, apple-green fascia over its middle, and a median spot of the same colour upon posterior lobe.

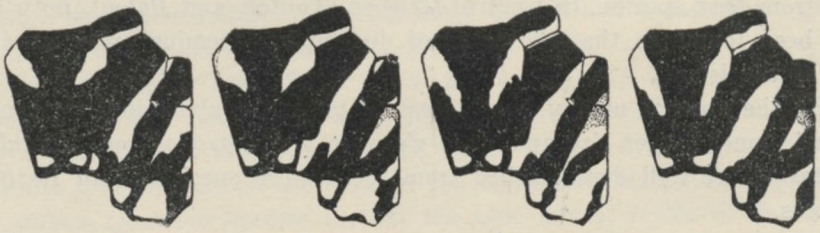


Fig. 1. — Thoracic colour-pattern diagrams of *Podolestes orientalis* SELYS, ♂ W. Borneo (left and left centre), Billiton (right centre), and S. Sumatra (right).

Synthorax bronzy-black with coppery-red reflections on dorsum. Markings sharply defined, bright blue or rather more greenish-blue, as shown in fig. 1 (left sketches). First lateral pale fascia rather narrow, irregular in outline, markedly constricted or completely divided above, and in that case forming an isolated juxta-humeral pale spot on the upper part of each mesepimerite. Thoracic sides and venter pruinose.

Legs pale brown; femora with an ante-apical brown ring and with the knees also brown.

Wings hyaline or slightly smoky. Pterostigma yellowish-brown, or wholly black. Postnodals $\frac{19-22}{19-20}$.

Ground-colour of first 5 abdominal segments reddish-brown, growing darker apically, and almost black on segm. 7 - 10. Segm. 1 blue, with a small mid-dorsal blackish spot; 2 with bilobed mid-dorsal spot of bright blue, occupying the basal half and with the sides also blue. Segm. 3 - 6 with narrow basal rings, which are distinctly bluish on the back of 3 and 4; sides yellowish posteriorly; terminal rings almost black. Segm. 7 - 10 black, 8 with fine mid-dorsal pale line; a complete and sharply delimited bluish spot, restricted to the dorsum, on each of the segments 9 and 10, widest at the end of 9. Apps. dark brown, not different in shape from those of our Sumatran specimens, described below.

F e m a l e (id., juv.). — Applying perfectly to Selys' and Krüger's descriptions, except that the pale thoracic markings are enlarged and light purplish-blue in colour; the antehumeral bands are also longer, similar to the ♂. Postnodals $\frac{18-21}{19}$.

Basal rings present on abdominal segments 2 - 7, pale blue in colour, each of them projecting to behind mid-dorsally. Dorsum of 8 - 10 with inverted triangular bluish spots over the entire length of each.

Valves long, though not projecting beyond the tips of appendages, their lower margin straight.

Length: ♂ abd. + app. 31 - 32, hw. 26.5 - 27; ♀ 29, 27 mm.
(Measurements of ♀ type, Malaisie: abd. 30, hw. 28 mm
♀ paratype, S. Borneo: — 31, — 29 —
♀ Ris, C. Sumatra: — 32, — 27 —).

M a l e (Billiton). — Differs from the Bornean specimens by its more robust build, and by the absence of any pale markings on dorsum of segm. 8 - 9. The spot on the back of segm. 10 is very small. Thorax warm purplish-brown with fine coppery-red reflections; markings very distinct, bright blue-green. Antehumeral stripes more elongate and longer; first lateral stripe broader (fig. 1 right centre). Sides and underparts of thorax pruinose blue. Legs pale yellowish-brown, marked similarly to the Bornean specimens. Pterostigma ochreous. Postnodals $\frac{19}{18-19}$.

Length: abd. + app. 33, hw. 28 mm.

M a l e (S. Sumatra). — The specimens of this series, in view of their large size, robust build and strikingly beautiful colours, are very conspicuous insects. The occiput, the entire prothorax and the sides and underparts of the thorax are overled with a delicate purplish-white pruinescence, so that, in some individuals, the markings are not easily made out. All agree in having the antehumeral bands narrower and longer than in the Bornean males, the pale markings of the thorax being of a bright apple-green colour (fig. 1 right).

The legs are almost entirely black while only the outer sides of the tibiae are yellow. Pterostigma jet-black. Postnodals $\frac{22-26}{21-24}$.

They further differ from examples of W. Borneo by the green basal rings of the abdominal segments being still narrower and interrupted on mid-dorsum. Segm. 7 - 10 and the anal apps. are wholly black.

Sup. anal apps. longer than inferior pair, strongly curved with the tips meeting or crossing each other. The inf. apps. are considerably widened behind their middle, with apices rounded; their inner and lower surfaces are golden-yellow in colour, and the lower surface is furnished with a dense bunch of soft golden-yellow hairs. Along the margin of the 10th abdominal sternite, and the base of inf. apps., similar tufts of golden hairs are plainly visible. About the middle of the upper side of each of the inf. apps. there is, besides, a small corrugated area, which, in the oldest individuals, is densely covered with a granular pruinescence (fig. 2).

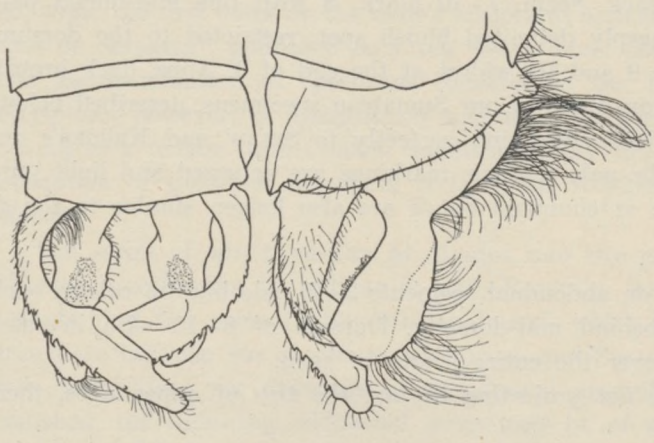


Fig. 2. — *Podolestes orientalis* SELYS, ♂ S. Sumatra. Anal appendages, dorsal view and right side.

Length: abd. + app. 35 - 37, hw. 30 - 31.5 mm.

After a comparison of Bornean examples of *orientalis* with the much stouter and rather darker individuals of the southern districts of Sumatra, I was rather inclined to regard the latter sufficiently distinguished to give them subspecific rank. The body-pattern is a little different, the legs are almost black instead of yellowish, and these features, together with the superior size of these Sumatran specimens, account largely for their different appearance. Now KRÜGER, while discussing the ♂ of Soekaranda, in N.E. Sumatra, describes the legs as "schmutzig-gelblich, an den Schenkeln aussen dunkler". The thoracic pattern of the teneral ♀, according to KRÜGER, fits well in with SELYS's description of a Bornean example. As we have seen, the Billiton specimen is intermediate in all respects, except that the legs are also pale in colour. It should be still borne in mind that the thoracic markings are not alike in any of the specimens examined, and this circumstance, together with the absence of any structural differences, obviously points to a great amount of individual colour-variation.

In view of all this, it seems best for the present to refrain from giving our Lampong series a subspecific name, the more so as the type-locality of *orientalis* is unknown.

While collecting near Kotaägoeng, my attention was first drawn to this insect by seeing a large Zygopteron, resting in a Lestid position on a bare twig among the tangly growth of shrubs overhanging a very small muddy brook,

flowing through secondary forest. The insect rested with its wings half outspread, so that I first thought it was a *Lestes*. Three other specimens were caught not long afterwards over the same brook, and a single female was observed while ovipositing in the bark of a rotten branch, few inches above the water's surface; unfortunately I failed to secure it.

Apparently, *P. orientalis* has a wide distribution in Malaysia, ranging from Pahang in Malaya, through the whole of Sumatra and the Riouw Archipelago, to Billiton I. and Borneo.

Podolestes chrysopus Selys (fig. 3).

Chief references:

1886. Selys, Rev. Syn. Agrion. p. 89 sep. (♂ only). — ♂ Sintang, W. Borneo (*orientalis*).
1889. Selys, Ann. Mus. civ. Genova, 27, p. 480. — ♂♀ W. Borneo.
1924. Laidlaw, Journ. Mal. Br. Roy. Asiatic Soc. 2, p. 302, pl. 3 fig. 2 (wings).

Material examined: — 1 ♂ (in fragments and discoloured), Central W. Borneo, forest-marsh near Bika River, Jan. 4, 1925, H. Winkler leg. (Mus. Hamburg). — 1 ♂, 1 ♀, W. Borneo, Singkawang, forest-marsh near Paser Pandjang & Tjapkala Rd., Oct. 27 & July 14, 1932; 15 ♂, 8 ♀, idem, forest-marsh near Bakoean, July 20 & Dec. 7, 1931; Febr. 17, July 19 - 20, Sept. 15, Oct. 27, 1932; Jan. 16, 1934; all L. Coomans de Ruiter leg.

This is doubtlessly the same species as that described by de Selys in the "Revision" as a ♂ of *orientalis*. The types are much faded and entirely discoloured individuals, which, in his "Odonates de Sumatra", were recognized by de Selys as specifically distinct from *orientalis*. *P. chrysopus* has also been reported from Sarawak by Laidlaw and Hincks, and the first named author has published a valuable photograph of the wings after a specimen of Borneo.

Curiously enough, a complete and adequate description of this species is nowhere to be found in the literature, the only references to colours and genital structures being those published many years ago by de Selys, and these, too, are very fragmentary.

The fully adult male is brightly coloured about the body — as is also the female — and although the ground-colour of the thorax is almost uniformly metallic-green, both sexes of *P. chrysopus* are most conspicuous insects on account of the light blue patches and bands of pruinescence covering the occiput, the prothorax and several parts of the synthorax. The following is a description after specimens whose colours are best preserved.

Male (ad., not pruinose). — Head entirely black, with slight bronzy-green reflections. Labrum glossy black, occipital lobes also rather shiny anteriorly. An indistinct brownish spot on either side of the lateral ocelli. Antennae black. Pro- and synthorax black, upper parts of mesothorax with bronzy-green reflections. Sides also dark in colour except the mesinfraepisternites, and a small area around the spiracle on the lower portion of the metepisternites, which are dirty brown in colour. The metepimerum is likewise brown, but in

the centre lies a large, strongly constricted, bronzy-green spot which coalesces behind with the dark patch on metepisternum. Venter flesh-coloured or dirty brown.

Legs yellowish- or pale reddish-brown; outer surfaces of femora gradually somewhat darkened apically; inner surfaces of all femora and tibiae bright sulphur-yellow; tarsi blackish.

Wings hyaline. Pterostigma jet-black. Postnodals $\frac{13-15}{12-14}$.

Abdomen with segm. 1 - 2 bronzy-green above, this colour indistinctly limited on each side, fading to brown laterally. Segm. 3 - 6 with a narrow yellow basal ring and with the sides also partly yellowish; dorsum with ill-limited longitudinal bronzy-black markings, which are abruptly widened posteriorly before the apex of each segment, so as to form distinct dark apical rings; dorsum of 7 also black and with a similar apical ring, sides dark brown. Segm. 8 - 10 and appendages bronzy-black, the basal third of superiors reddish-brown in well preserved specimens.

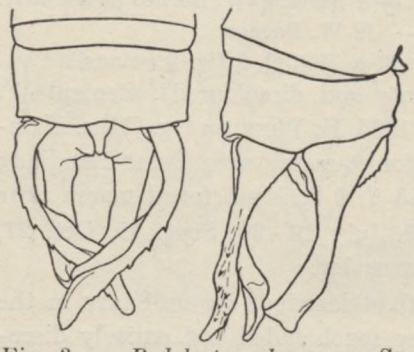


Fig. 3. — *Podolestes chrysopus* SELYS, ♂ W. Borneo. Anal appendages, dorsal view and right side.

Appendages more slenderly built than in *orientalis*, sparsely pilose, without tufts of soft hair (fig. 3).

M a l e (ad., pruinose). — By the delicate, light velvet-blue pruinescence covering various parts of the body, the fully coloured male of *chrysopus* is as beautiful and conspicuous an insect as the adult of *orientalis*. Although the ground-colour of the body is of an uniform bronzy tint, the distribution of these patches of powdery substance gives the insect a very striking appearance. These pruinose-blue areas are to be seen on the following parts of the body: A narrow strip along occipital margin; the entire occiput; the whole of the prothorax (usually the posterior lobe excepted); a rounded patch on either side of the median carina upon lower third of each mesepisternite; and an oblique fascia, narrowest above, running roundabout the thorax, from a point just in front of each ante-alar triangle to the coxae of the posterior pair of legs, crossing the upper end of humeral suture and the spiracle. Moreover, the points of articulation of the wings, the thoracic nota, and the outer surfaces of all coxae, are pruinose blue, as well as a dorsolateral ring on the basal third of the 2nd abdominal segment.

F e m a l e (ad.). — Differs in no respects from the ♂, except that the femora are slightly darker, reddish-brown, the colour of the interior surfaces of the legs being much duller and dirty ochreous instead of sulphur-coloured. Pterostigma usually lighter, sepia-brown.

Abdomen stout, with cylindrical segments. Segm. 8 - 9 blackish with a reddish-brown side-spot. Valves very long, surpassing tips of appendages for about

1 mm. Colour brownish-yellow at base, darker towards apices; lower margin slightly convex, unarmed.

Length: ♂ abd. + app. 29 - 30.5, hw. 22 - 24; ♀ (incl. valves) 28 - 29, 24 - 25 mm.

So far known *P. chrysopus* is confined to Borneo.

Fam. Libellulidae.

Nannophyopsis, gen.nov.

Size minute. Body smooth and shiny. Coloration throughout steely black, with rich coppery reflections; no markings.

Head very large. Eyes longer than wide, their median line long, almost twice longer than occipital triangle. Frons narrower than the transverse diameter of the eye, short and sloping; furrow shallowly concave. Vertex rather high, almost rounded.

Prothorax with posterior lobe moderate, larger than in *Nannophya*, slightly elevated and notched in the middle, the lobes evenly rounded and bearing a fringe of long, soft hair.

Synthorax very short and narrow, widest anteriorly, with projecting shoulders; pile short and scanty.

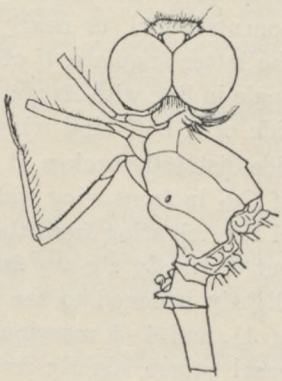


Fig. 4. — *Nannophyopsis chalcosoma*, gen. et sp. n. ♂ Anterior portion of body, showing principal structures.

Legs rather long and slender; posterior femora of both sexes armed with numerous saw-like denticles interiorly, the last one being in the form of an ordinary spine. Basal half (♂) or basal third (♀) of middle femora with a similar row of denticles, followed by a row of 4 (♂) or 6 (♀) gradually enlarged spines, which are about as long as the space between two of them; posterior two-thirds of anterior femora with 4 - 5 similarly placed, though rather longer, spines. Armature of legs otherwise similar to *Nannophya*, the bristles more closely approximated and more numerous (*e.g.* middle tibiae with 8 instead of 6 bristles in *N. pygmaea*). Tarsal claws with a distinct tooth near the apex.

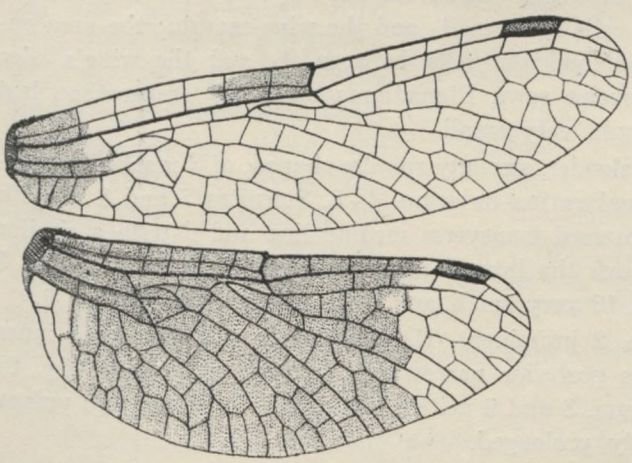


Fig. 5. — *Nannophyopsis chalcosoma*, gen. et sp. n. ♂ holotype. Right pair of wings.

Wings broad. Shape of front and hind wings noticeably dissimilar; hind wing broad and considerably shorter than front wing: 2nd discoidal cross-nerve of front wing in line with the nodus of hind wing. Membrane partly coloured. Neuration open. Nodus in front wing placed at middle, in hind wing distinctly proximal to the middle of the wing. Common stalk of M_{1-3} and M_4 arising distinctly below middle of *Arc* in front wing, nearer to the middle in hind wing; fused for a long distance in both pairs. All *t*, *ti* and *ht* free. *t* of front wing distal to that of hind wing, 5-sided, with costal side strongly broken, the components equal, or nearly equal in length; proximal and distal sides subequal, the latter angulate. *ti* of front wing slightly larger than *t*, 6-sided, its proximal angle in line with *Arc*, and its costal and anal sides not coinciding with proximal side of *t*. *t* of hind wing at, or very slightly distal to *Arc*, 4-sided, the costal side distinctly broken at about ¾ of its length. *Arc* between Ax_1 and Ax_2 Origin of Cu_1 in front wing widely (♂), or but little (♀) separated from the anal angle of *t*, originating from the distal side of it. Basal course of M_4 and Cu_1 slightly but distinctly zig-zag and only little convex anteriorly; discoidal field narrow, slightly widened to the wing-margin, beginning with one row of cells (2 or 3 × 1), and 4 - 5 marginal cells. Cu_1 in hind wing arising at anal angle of *t*, its basal course slightly irregular; discoidal field distinctly widened to the wing-margin, beginning with one row of cells (3 × 1), and 4 marginal cells. Nodal index $\frac{4.6.6.4}{3.5\,5.3}$. Last antenodal complete. Fork of M_{1-2} - M_3 at level between Ax_5 and Ax_6 in front wing, between Ax_4 and Ax_5 in hind wing. Common stalk of M_{1+2} strongly curved anterad in both pairs of wings. No supplementary bridge cross-vein and only 1 *Cux* in all wings. M_2 and *Rs* evenly curved towards the wing-margin. No *Rspl*. Anal loop in hind wing complete and rather long, extending far beyond level of *t*; A_1 well developed, Cu_2 and A_2 evenly curved, A_3 zig-zagged. Three basal cells between A_3 and the wing-margin; the area enclosed almost parallel-sided, and the cells between A_3 and the wing's edge distinctly disposed in transverse rows. Pterostigma moderate, longer than last postcostal space. Membranula very small.

Abdomen of ♂ very slender, strongly spindle-shaped, of ♀ markedly club-shaped. A dorsal longitudinal carina on segm. 4 - 9. Sternites 7 and 8 in both sexes with a distinctly impressed transverse median line and ♂ with a similar longitudinal impression above the lateral edges of segments 5 to 8. Segm. 8 about twice longer than 9, 10 very small and only one-third as long as 9.

Genitalia of segm. 2 prominent. Hamulus with well developed inner and outer branches. Lobus posterior narrow and projecting ventrad (fig. 6) ♀ with tergal margins of segm. 8 and 9 neither folded nor thickened; no vulvar scale. Ninth tergite slightly prolonged.

♂ Anal appendages subequal in length, only little shorter than segm. 9 + 10, slenderly built and of simple structure.

Genotype: *Nannophyopsis chalcosoma*, sp.n.

Habitat: Billiton I.

Nannophyopsis chalcosoma, sp.n. (fig. 4 - 6).

Material examined: — 1 ♂ (adult), E. Billiton I. (between S. Sumatra and Borneo), Gantoeng, Sept. 17, 1935, F. J. KUIPER leg. The specimen is the holotype. 2 ♀ (one juv.), same locality, Oct. 13, 1935, F. J. KUIPER leg. One of these is the allotype.

Male (ad.). — Labium glossy black with low metallic-blue reflections. Face black, almost lustreless, labrum and anteclypeus feebly transversely striate, the latter with a brownish basal streak on middle. Postclypeus shiny metallic-green, lateral edges fringed with long, bristle-like, golden-brown hair. Frons slightly rugose, brilliant metallic-green with coppery reflections; side-edges with a brownish-yellow spot close against the eye-margin; tubercles rounded; pile short and fine, though rather dense, brown in colour. Eyes chestnut-coloured. Occipital triangle and occiput glossy black.

Prothorax black; pile greyish-yellow.

Synthorax excessively short and narrow, wholly black; dorsum metallic-green, sides throughout most intensively brass-coloured with brilliant coppery-red reflections on the mesepimerites. Venter dull black, only slightly metallic anteriorly, and thinly pruinose.

Legs black; coxae and inner surfaces of anterior femora slightly pruinose.

Wings shaped as for genus. Membrane of front wing hyaline; bases, as far out as Ax_1 and slightly over *Cux*, deep golden-yellow; the costal and subcostal antenodal spaces, between Ax_5 and the nodus, are also gold-coloured. Hind wing, from base to a little before the pterostigma, wholly golden-yellow, this colour fairly well demarcated distad and rather abruptly leaving off; extreme bases, posterior to the vein *Cu*, and as far out as A_3, hyaline. Pterostigma rather long and narrow, greyish-brown in colour, its costal and anal margins thickened. Membranula very small, dark grey. Nodal index $\frac{4.6.6.4}{3.5.5.3}$.

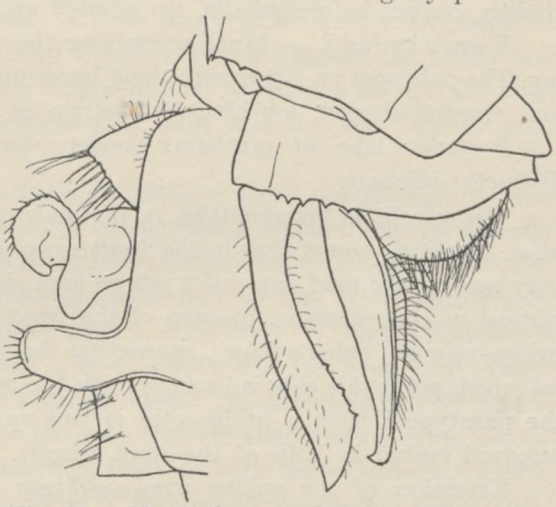


Fig. 6. — *Nannophyopsis chalcosoma*, gen. et sp. n. ♂. Left side-view of genitalia (penis omitted) and right side-view of appendages.

Abdomen smooth and very slender, markedly spindle-shaped, almost clubbed in dorsal aspect. Segm. 1 - 2 rather narrow though distinctly widened in dorso-ventral dimension, width over segm. 2 0.7 mm; 3 and 4 excessively narrow, cylindrical, only 0.4 mm wide, from 5 backwards evenly but considerably widened: widest point 1.4 mm, at end of segm. 7; these segments also somewhat

enlarged in dorso-ventral dimension. Segm. 7 - 9 roof-shaped and ridged. Apical segments narrowed, 10 considerably so, very small and nearly annular. Venter flattened, lower portions of 8th and 9th tergites a little projecting.

Colouring black without any pale markings; segm. 2 - 6 shiny bronze-green, 7 - 9 metallic purplish-black; 10 and appendages black. Intersegmental rings pruinose-blue aside and below.

Genitalia of segm. 2 comparatively large, projecting; lobus anterior triangular in side-view, with a distinct median notch and provided with stiff marginal bristles. Hamuli approximated, their inner branches broad and rounded, with short spinulose setae along margin; tips a little outbent and swollen apically; outer branches smooth and shiny, narrower than inner ones, directed obliquely sidewards, evenly rounded. Lobus posterior elongate, strongly and rather suddenly bent ventrad, provided along margin with a row of rather thick, spinulose setae. Vesicle of penis triangular, acute-angulate [1]).

Anal appendages closely approximated and excessively narrow in dorsal view, superiors meeting one another slightly before apex; when seen from above each of them is nearly straight and cylindrical, with pointed tips; in side view they are but little curved, bearing 3 or 4 very low teeth along apical third of ventral margin. App. inf. about equal in length, very broad at base, side-margins slightly convex before middle, tip pointed and a little upturned (fig. 6).

Female (ad.). — Much resembling the male in size as well as in colouring. The pale spot on either side along lower margin of frons is slightly enlarged and crescent-shaped, touching the margin of compound eye.

Posterior lobe of prothorax longer, slightly more upturned and more distinctly bilobate.

Wings a little broader than in the male, especially the hinder pair. Neuration identical, except that in the front wing the vein Cu_1 originates at a point very near to the anal angle of t, whose anal side, accordingly, is not so broken; instead of this, there is, in each of the front wings of the allotype, a curved bridge-vein or "Schaltsektor", connecting the dorsal fourth of the anal side of t (at which point this side is broken) with the opposite basal portion of Cu_1. [In the paratype ♀ such a bridge-vein is lacking and the origin of Cu_1 is again removed costad in both of the front wings].

Extension of the golden wing-markings exactly as in the opposite sex; colouring intensified: mars-yellow (RIDGWAY).

Abdomen short, with cylindrical segments. Colouring as in the male. Basal segments not widened nor inflated, narrowest at base of segm. 3 (0.6 mm!); then evenly and very considerably widened, attaining its greatest width at the end of segm. 6 (1.4 mm broad and 1.6 mm high), from which point the abdomen diminishes but little in width, giving it its definitely clubbed appearance. Segm. 10 very short and annular; appendages widely distant, with acutely pointed tips.

[1]) In the present specimen the penis is extruded and has been omitted from our sketch, in which, accordingly, the hamulus is perhaps shown in a slightly more forwardly bent position than appears to be natural.

Valvula vulvae not developed; eighth sternite not projecting nor produced backwards but provided along margin with two small, widely separated, knob-like prominencies.

Length: ♂ abdomen 10.2 (9.5 + 0.7 app.), front wing 12.8, hind wing 10.3: 4.3, pterostigma 1 mm; ♀ 10, 13.5, 11 : 5,1 mm.

The genus *Nannophyopsis* is here established to contain a very small and surprisingly aberrant member of the *Libellulidae*. In general appearance this dwarfish insect is entirely unlike anything known in this family and there are only few genera with which it may be transiently compared, *viz*, the nearctic *Nannothemis* and the austro-oriental *Nannophya*. These two genera, though entirely isolated in many respects, are doubtlessly allied and both are characterized by their reduced size and several venational peculiarities shared also by *Nannophyopsis*. It resembles more especially *Nannophya* in having the costal side of the triangle of the front wing distinctly broken, the common stalk of the veins M_1+_2 strongly arched towards the wing-margin, and the vein Cu_1 arising from the distal side of the front wing triangle. To me the relationship with this typically Brachydiplacine genus does not appear close, and the above enumerated characters after all are probably those of extreme specialization. In other details of venation the most obvious points of difference are found in the dissimilarity of the front and hind wings in *Nannophyopsis*, the longer and differently shaped pterostigma, the origin of Cu_1 in hind wing at the anal angle of *t*, the presence of a complete anal loop, and the very narrow anal field of the hind wing.

Nannophyopsis is further abundantly distinct from *Nannophya* — and *Nannothemis* as well — by its uniform bronzy-black colours, and its entirely different body-proportions. The head is much larger, while the great development of the compound eyes culminates in the median eye-line being considerably longer than in the members of these genera. The body of *Nannophyopsis* is almost smooth, whereas *Nannophya* and *Nannothemis* are hairy and comparatively robust and compactly built insects. Lastly, the narrowness of the thorax and the excessive constriction of the strongly clubbed abdomen are quite unique among the *Libellulidae*. These characters, together with the conspicuous golden patches upon the wings, give this insect a remarkably handsome appearance.

In the existing literature I have found only one description and sketch of a dragonfly whose characters and outward appearance would seem to correspond fairly well with our specimens of *Nannophyopsis*. This is ***Nannodiplax clara***, described on p. 120 and figured on pl. 12 of J. G. Needham's "Manual of the Dragonflies of China" (Zool. Sinica, Ser. A, vol. 11, fasc. 1, Peiping, 1930). This species, of which only a single female has been described from Soochow in China, bears a quite striking superficial resemblance to *Nannophyopsis*, so much so in fact that the similarity of some characters suggests real affinity with *Nannophyopsis*. These characters are:

Entire body bronze-green without pattern;

Hind wing distinctly shortened and membrane of both pairs with almost identical golden-yellow spots;

Large head and spindle-shaped abdomen;

Open neuration, narrow wing-bases, rather similarly formed and much broadened hind wings, with a long anal loop and narrow, parallel-sided anal area;

Simple curving of main veins, reduced number of ante- and postnodal cross-nerves, large pterostigma.

Thus, this species shows distinct relation with *Nannophyopsis* and *ipso facto* there is no real doubt about NEEDHAM's species being incorrectly determined as a *Nannodiplax*.

Characters not shared by *Nannophyopsis* are:

Size larger (abd. 14, hw. 17 mm);

Triangles and subtriangle normal, costal side of *t* in front wing only slightly and very unequally broken;

Cu_1 arising at anal angle of *t* in both pairs of wings;

Two rows of cells in the discoidal field of front wing;

Two rows of cells between distal course of A_3 and the wing-margin;

No costal convexity of the foot-stalk of M_{1+2};

Forking of Cu_2 and A_1 in hind wing almost under a right angle.

These characters, on the other hand, separate *N. clara* decisively from *Nannophyopsis*. It is indeed very unfortunate that only the female of NEEDHAM's insect is known; its separation from the genus *Nannodiplax* seems necessary, but the erection of a new genus to include it is better postponed till more material is available and constant characters can be detected. I do not think it at all probable that *N. clara* can remain in the *Sympetrini*. The inter-relationships of the Old- and New World genera still united in the heterogeneous assemblage of the *Brachydiplacini* are very difficult to tabulate, and although I am inclined to think that *Nannophyopsis* and *Nannodiplax clara* must take their place among the genera of this tribe, I cannot at present indicate their exact position much more clearly than this.

To Mr. KUIPER, of Tandjong Pandan, who gratuitously presented me with several fine collections of *Odonata* from the island of Billiton, I owe my sincerest thanks for the opportunity of studying this remarkable aberrant dragonfly. Through this gentleman's disinterested efforts I was finally enabled to study both sexes of *Nannophyopsis*, for soon after the discovery of the male Mr. KUIPER was successfully enough to secure the female in the same place.

Mr. KUIPER states that the insect was found by him along a small ditch carrying off the superfluous water of an extensive marsh, near a so-called 't e b a t' (big reservoir of the tin-workings), keeping company with *Nannophya pygmaea*.

Fam. Corduliidae.

Procordulia astridae, sp.n.

1935. Lieftinck, Nova Guinea, Zool. 17, 2, p. 295 (key), 299 (descr. ♀). — ♀ N. New Guinea (*P. sylvia*, ♀ only!).

Material examined: 1 ♀ (juv.), N. New Guinea, Cycloop Mts., ca 1000 m alt., May 19, 1932; 1 ♂ (semiad.), same loc., April 14, 1935, W. Stüber leg.

In the above quoted 3rd part of my monograph of the Papuan *Odonata*, I distinguished two species of *Procordulia* so far known from New Guinea, viz, *P. leopoldi* Fras., and *P. sylvia* m., both of them being found only at high altitudes. To my description of the holotype ♂ of *P. sylvia*, which is a small and darkly coloured species, I added a description of a much larger and differently coloured ♀ which I referred to *sylvia* with some misgivings. Just after the completion of the paper, I received from Mr. Stüber a single ♂ caught by him in the same place, and this insect now proves quite distinct from *sylvia*, corresponding exactly with the unique ♀ previously referred to that species.

The present paper affords an opportunity to include a preliminary account of the ♂ of Mr. Stüber's species, which I propose to name *P. astridae*. A detailed description with drawings of genital structures will appear in one of the forthcoming parts of the Nova Guinea series.

M a l e (not fully ad.). — Immediately distinguished from *sylvia* by its superior size, much longer legs, bright metallic-green body, and different genital organs and appendages.

Head large, coloured as in *sylvia*, but with the vertex still more transverse and wholly purplish-blue. Thorax throughout brilliant metallic-green, lower parts dull reddish-brown, upper- and side-parts not so pily as in *sylvia*.

Legs long and slender, light reddish-brown in colour; knees darkened, tarsi jet-black. Hind femora 10, tibiae 9 mm long.

Wings hyaline, shaped much as in *sylvia*, but apices more pointed. Bases golden-yellow as far out as *Cux* in hind wing. Neuration similar, but the anal triangle broader and much shorter than in that species, scarcely twice longer than its width at base; the cross-nerve only little oblique, placed in the lower corner of the triangle. Membranule much as in *P. leopoldi*. Pterostigma very small, reddish-brown, equal in length to *sylvia*. Nodal index $\frac{6.11\ 12.7}{10.\ 7.\ 7.9}$.

Genitalia similar to those of *leopoldi;* the hamule is less strongly curved and the posterior lobe is narrower.

Abdomen shaped similarly to *leopoldi;* segm. 1 - 7 brilliant emerald-green, the metallic lustre especially vivid on segm. 1 - 3. Sides of 1 and lower portion of 2 brownish. Segments 6 to 9 bear indistinct reddish postero-lateral spots, while the ground-colour of 8 - 10 is dark brown.

Anal appendages entirely different from *sylvia*. Superior pair resembling those of *leopoldi*, though broader and widened soon after their base, each of them being provided before middle with a ridge-shaped interior projection,

about 0.8 mm in length, and a bluntly triangular exterior tooth, situated beyond the middle of each. App. inf. distinctly shorter than superiors.

Length: abd. + app. 42, hw. 38.5 mm.

It follows from the above description that *astridae* comes nearest to *leopoldi*. The latter is chiefly characterized by the velvet-black apical segments of the abdomen, the black legs and the shape of its anal appendages.

The female of *P. sylvia* is still unknown.

Macromia mnemosyne, sp.n. (fig. 7).

Material examined: -- 2 ♂ (ad.), W. Borneo, Singkawang, swampy forest near Bakoean, low country, Jan. 22 and April 9, 1934 ("at dusk"), L. COOMANS DE RUITER leg.

Belongs to group IV of *M. calliope* RIS (cf. LIEFTINCK, Tijdschr. Ent. 72, 1929, p. 65). Allied to *M. corycia* LAIDLAW.

M a l e (ad.). — Mouth-parts dark brown, postclypeus with two pale brownish pits. Frons entirely metallic-blue; pyramidal processes widely distant, pointed, furrow deep, inner surfaces not flattened nor framed. Vertex metallic-violet, bifid. Occiput shiny black.

Synthorax brilliant metallic-green. A very narrow buff-coloured antehumeral stripe, pointed to above and not reaching half-way up the dorsum. Most of the ante-alar triangles bright yellow. Thoracic sides with a sharply defined but very narrow yellow band across the stigma. Venter bluish-black, a whitish stripe along latero-ventral margin of each metepimerite, and a V-shaped marking upon the poststernum.

Legs very long and slender, black; tibial keels yellow; hind femora (incl. troch.) 9 mm long.

Wings tinged with greyish-yellow all over the membrane, especially in the anal angle of hind wing. A vestigial ferruginous basal spot in *c*, *sc* and *cu* of all wings. Costa black. Pterostigma small, black. Membranule long, basal one-fourth pure white, remainder grey. Anal area very broad. Anal triangle two-celled; anal margin between membranule and angle very short, slightly concave. Antenodals $\frac{13-15}{10}$, postnodals $\frac{5-6}{8-9}$, *ht* $\frac{3}{2}$, *Cux* $\frac{5}{3}$. Anal loop 7-celled, without central cell.

Abdomen slender; segm. 2 slightly, 7 - 9 strongly inflated in both dimensions, widest at end of segm. 8. Segm. 1 - 2 black, sides of 2 with an irregular, oblique yellow marking (widest ventrally) from below upwards to the auricles, and a transverse yellow mark on mid-dorsum. Segm. 3 - 6 metallic-green, unmarked save for two small yellow side-spots close before and after the transverse ridge of 3. Segm. 7 - 10 and appendages black; 7 with a transverse basal mark of orange-yellow, confined to the dorsum, ceasing at the transverse carina and hence occupying less than the basal one-fifth of the segment. Segm. 8 with a small triangular yellow spot, placed before the middle of the segment, along side-margin, which spot is continued below, covering the antero-ventral portion of the tergite. No dorsal spine on segm. 10, the upper margin of which is straight

in side-view; the base of this segment is rather hollowed out above, but provided with a fine longitudinal ridge over its middle.

Genitalia of segm. 2 very prominent; hamulus plate-shaped, laterally compressed, very broad at base, the distal portion abruptly narrowed and very slender with slightly thickened but pointed apex.

Anal appendages, upper pair widely distant, slightly outcurved at middle, each with a very stout pointed extero-lateral tooth at about middle; tips also pointed, extreme apices either directed almost straight backwards (allotype, fig. 7), or distinctly recurved and directed a little upwards (type).

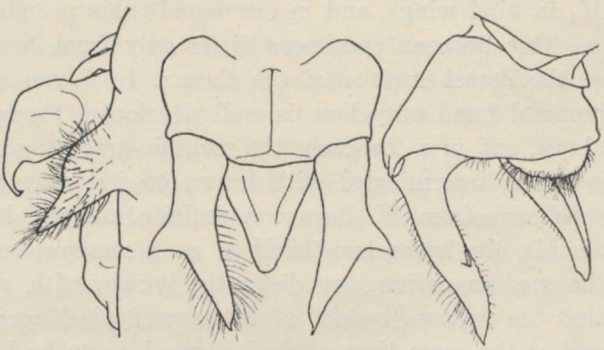


Fig. 7. — *Macromia mnemosyne*, sp. n. ♂ W. Borneo. Left side-view of genitalia, and anal appendages, dorsal view and right side.

Length: abd. + app. 45 - 46, hw. 36, pt. 2 mm.

This fine new species is allied to *M. corycia* LAIDLAW (Journal Str. Br. Royal As. Soc. 85, 1922, p. 220, 225, fig. 5 — genit. ♂), of which only the type, a male from Sarawak (Borneo), is known. *M. mnemosyne* is immediately distinguished from it by the robust m e d i a n exterior tooth of the upper appendages, which in *corycia* is situated almost at the apex. *M. mnemosyne* is the 6th representative of the genus on Borneo, and we may confidently look for more.

Macromia westwoodi SELYS 1874.

1929. LIEFTINCK, Tijdschr. Ent. 72, p. 62, 69, figs.

Material examined: 1 ♀ (juv.), S.W. S u m a t r a, Benkoelen Res., Boekit Itam near Tandjong Sakti, 650 m, July 18, 1935, Mrs. M. E. WALSH leg. — 2 ♂, 1 ♀ (ad.), W. B o r n e o, Singkawang, swampy forest near Bakoean, low country, Sept. 15, 1932 (♀), Mt. Poteng, 450 m alt., in dark ravine, Febr. 7 and Sept. 11, 1932 (2 ♂), L. COOMANS DE RUITER leg.

This is the first record of this species for Sumatra as well as for Borneo. As has been pointed out in my paper on Malaysian *Macromia* (loc. cit.), it is still a matter of doubt, without an examination of KRÜGER's ♂ of *Macromia westwoodi* from Soekaranda in N.E. Sumatra, whether this specimen belongs to *westwoodi* or might be the same as *cydippe* LAIDLAW, with which it is closely related. The occurrence of one of these species, or both, on Sumatra was very likely, but the discovery in Benkoelen of the true *westwoodi* fills up the long existing break in the continuity of its known distribution.

M. westwoodi was hitherto only known from Penang and Perak in Malaya, and from Java, where it is a scarce species in virgin forest; it breeds in leaf-bottomed forest-pools with clear water.

The single ♀ of Sumatra, although being in a teneral condition, could be identified as this species with absolute certainty. So far as colours are concerned I cannot find any differences with specimens from Java, but, as has been mentioned in my previous description (l.c. p. 70), *westwoodi* is easily recognized by the curious apical curving of the main veins of its wings (especially M_3 and M_4 in hind wing), and in our female this peculiarity is well demonstrated.

Our Bornean specimens differ only from Javan individuals by the colour of the dorsal surface of the thorax. In Javan examples an incomplete oval humeral band of yellow is well developed, though often not sharply defined above, and in a few cases the metallic-green space between these yellow bands is rather intermingled with brown on its lower portion. In the three mature specimens from W. Borneo a definite humeral band is wanting, and instead of this, the lower two-thirds of each mesepisternite, except on both sides of the median carina, are distinctly brown, with very faint metallic lustre, so that the yellow "bands" of the more typical specimens appear much enlarged and at the same time effaced so much as to be hardly traceable. As, however, the genitalia and appendages are exactly identical in our examples of both islands, I do not even think it advisable to ascribe subspecific value to the colour-difference just mentioned.

Mr. COOMANS DE RUITER informs me that one of the males from Bakoean, like the foregoing species, was taken by him at dusk.

Macromia cydippe LAIDLAW 1922.

1929. LIEFTINCK, Tijdschr. Ent. 72, p. 63, 73 - 76, figs. — ♂ Borneo, Banka.

Material examined: — 1 ♂ (not fully adult), W. Java, Tjibarangbang River, about 7 km. West of Djasinga (Buitenzorg Res.), ca 150 m alt., May 26, 1935, AUTHOR leg.

This is a very scarce species of which only few specimens were known with certainty, *viz*, one ♂ from Sarawak (Borneo), one from British North Borneo, and one from the island of Banka [1]). The female has not yet been described.

Our Javan specimen is new to the fauna of that island, which now includes no less than 6 species of *Macromia*. It is not appreciably different from the two males discussed by me earlier, and the characteristic genital structures correspond exactly with my drawings of these organs. Perhaps the appendix inferior is still a trace longer than in the male from Borneo, but I can find no other discrepancies.

The nodal index is $\frac{6.15.14.\ 6}{9.10.10.10}$; *Cux* $\frac{6\ 6}{4\ 4}$; *ht* $\frac{3\ 3}{2\ 1}$.

Length: abd. + app. 44, hw. 40, pt. 2.5 mm.

This unique specimen was first seen into the gravelly bed of the Tjibarangbang; it was hawking wildly over the stream but finally came to rest,

[1]) In Treubia, 14, 1934, p. 461, the record 'Banka' for *M. westwoodi* is erroneous and should be withdrawn.

some 12 ft. high, among the foliage of a small tree overhanging the water. It was the only specimen observed.

Macromia septima MARTIN 1904.

1929. LIEFTINCK, Tijdschr. Ent. 72, p. 67 (key), 100 - 103, figs. — ♂♀ Java.
1934. LIEFTINCK, Treubia 14, p. 434. — ♂♀ Java, notes.

Material examined: — 1 ♂ (ad.), W. Java, Tjibeureum River, about 10 km S.W. of Djasinga (Buitenzorg Res.), ca 150 m alt., Oct. 16, 1935, AUTHOR leg. — Several ♂♂, W. Java, Djampang Tengah, Mts. Tjisoeroe, Tjimerang, 4 - 600 m, captured during most of the year, Mrs. M. E. WALSH misit.

Of this species, which does not seem to have been found outside Java, little was known of its breeding-places. It is possibly widely distributed in West Java but easily escapes notice in view of its rapid restless flight and obscure colouring. A single male was captured and a few others were seen hawking over a stream near Kembangkoening. This locality is only few miles off from the neighbouring Tjibarangbang where I took *M. cydippe*. Both of these streams flow slowly through flat country and the beds are closed in by overarching trees and scrub, through which the sun penetrates only in places. In the dry season the water is shallow, and, when flying up and down the river, the *Macromias* appear and disappear rapidly as the sun comes out or goes in. The males of this insect disport themselves in the air with astonishing speed and are very difficult to catch.

Macromidia fulva LAIDLAW (fig. 8).

1915. LAIDLAW, Proc. Zool. Soc. London, p. 29 - 30, fig. 3 (wings ♂). — ♂ Mt. Kina Balu (N. Borneo).
1920. LAIDLAW, Idem, p. 319. — ♀ Mt. Matang (N. Borneo).

Material examined: — 1 ♂ (nearly ad.), 1 ♀ (juv.), W. Borneo, Singkawang, Bagak River, Mt. Poteng-Mt. Raja complex, ca 350 m alt., June 25 1932, L. COOMANS DE RUITER leg.

The unique male of this remarkable little species was captured by Mr. COOMANS on the same day as the female, along a small river. The female is slightly immature and the abdomen is not fully coloured, but the male has remained in an excellent state of preservation, displaying a fine colour-pattern of metallic green and various shades of brown.

Male. — Slightly smaller than the type: abd. + app. 35, hw. 32.5, pt. 2.7 mm. Nodal index $\frac{11.20.18.11}{14.11.11.17}$; *Cux* $\frac{2.2}{3\,3}$; *ht* $\frac{2.3}{1.2}$; anal loop 8-celled, without central cell. Membrane slightly suffused with yellow all over. Golden brown basal spots not extending beyond first antenodal cross-vein in *sc*, faintly developed in *c*, *cu* and *m*. Wings otherwise as in the type.

Body-colouring not different from LAIDLAW's description of the type. Legs with nearly the distal half of the fore and middle tibiae, and with the distal three-fourths of the posterior tibiae distinctly keeled.

Abdomen slender, markedly spindle-shaped, inasmuch as the terminal segments, from the base of segm. 6 to the base of 8 are greatly expanded laterally (width of segm. 4 slightly over 1 mm, at end of segm. 7 slightly less than 3 mm); the tenth segment is vestigial.

The genitalia of segm. 2 have not been described or figured. The genital hamule and lobe are both of them extremely small and scarcely visible; the hamulus is placed in the long axis of the body but its anterior part is transversely elevated, forming an inwardly bent and strongly curved end-hook whose apex is black; between the hamuli a paired median body is visible in side-view, which probably is the proximal portion of the penis (fig. 8).

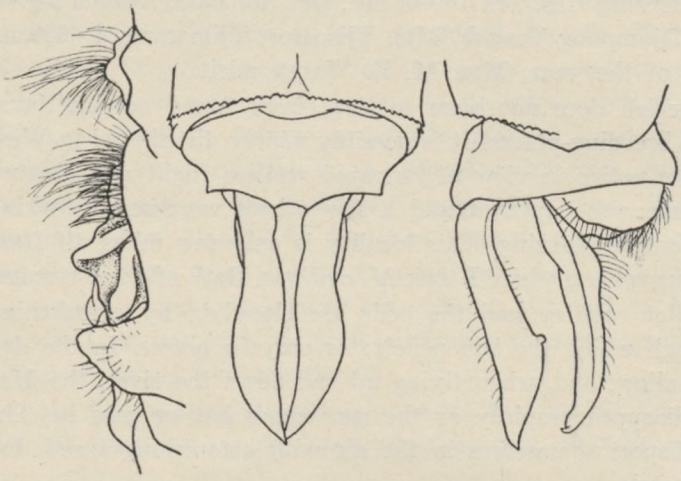


Fig. 8. — *Macromidia fulva* LAIDLAW, ♂ W. Borneo. Left side-view of genitalia, and anal appendages, dorsal view and right side.

A drawing of the anal appendages is also given here for the first time (fig. 8).

F e m a l e. — Similar to the male in most respects. Wings almost colourless except the bases, which are yellow, and a golden-brown patch in *c* and *sc* to a level between Ax_2 and Ax_3 in front wing, and between Ax_1 and Ax_2 in hind wing. Antenodals $\frac{20}{10}$, postnodals $\frac{13}{15}$; *Cux* $\frac{2.2}{3\,3}$; *ht* $\frac{2.2}{1.1}$; anal loop 10-12-celled, including one or two central cells. Front wings with two rows of cells in the discoidal field up to a level of the nodus (similar to the male).

Valvula vulvae completely divided into narrowly triangular, pointed blades, which are a trace longer than half the length of segm. 9.

Abd. 34.5, hw. 35, pt. 3 mm.

Macromidia atrovirens, sp.n.

Material examined: — 1 ♀ (adult), S. S u m a t r a, Benkoelen residency, Boekit Itam, 6 - 700 m, June 11 - 15, 1935, M. E. WALSH leg. The specimen is the holotype.

Allied to *M. genialis* LAIDLAW, from the Malay Peninsula, but much larger.

F e m a l e. — Labium and mouth-parts ochraceous-orange, labrum tawny. Clypeus and frons cinnamon-brown, this colour upwards turning to auburn and mummy-brown; the granular upper parts of the frons almost black with

faint bronzy reflections. Vertex densely punctured, black. Antennae dark brown. Occipital triangle and occiput glossy black.

Synthorax brilliant metallic-green above and aside; an indistinct line along humeral suture, the mesinfraepisternites and the lower half of the metinfraepisternites, as well as the entire under-surface of the thorax dark reddish-brown, not metallic.

Legs black; coxae and the bases of the anterior pair of femora dark brown.

Wings strongly tinged with yellowish-brown all over the membrane; this colour most conspicuous along anterior margin and towards the apices. Pterostigma cinnamon-brown. Neuration dense, as for genus. Nodal index $\frac{12.20.19.12}{17\ 11.12.16}$; *Cux* $\frac{4.4}{3.3}$; *ht* $\frac{2\ 3}{2\ 2}$. In front wing only one row of cells in the discoidal field (about 2 - 3 cells proximal to the nodus), followed by two and more cells. Anal loop containing 9 - 10 cells, including one central cell.

Abdomen dark in colour; segm. 1 - 6 shiny bronzy-black above, the three basal segments with metallic-green intermingling; sides polished. Markings very indistinct; sides of 2 largely reddish-brown, and the lower portion of the tergites of segm. 5 - 8 also rather ferruginous or orangish. Sternites reddish-brown. Terminal segments almost black, thicker than the preceding ones. Segm. 10 and appendages very small, subequal in length, the latter conical and pointed.

Valvula vulvae barely one-fourth as long as segm. 9, deeply and triangularly excised, so as to form two very small, rather convex blades, which are well rounded apically.

Length: abd. 36, hw. 37.5, pt. 3.2 mm.

With the new species, described above, the genus *Macromidia* now includes the following six species:

1. — *Macromidia rapida* Martin (Cat. Coll. Selys, Cordul. fasc. 17, 1906, p. 79 - 80, fig. 92 (wings), pl. 3 fig. 18 (insect), the genotype, from Tonkin. — Size moderate: ♂♀ abd. 36, hw. ♂ 31 - 32, ♀ 35 mm. Two rows of cells in the discoidal field of front wing, up to a level of the nodus, and with 3 single cells, followed by two rows in that of the hind wing. Three rows of cells between anal loop and the wing-margin. Antenodals $\frac{16-20}{9-10}$. Body metallic-green; thoracic sides with two yellow bands. Abdomen with sharply defined, yellow mid-dorsal longitudinal spots on segm. 3 - 7 and a few yellow points on 2 and 8.

2. — *Macromidia donaldi* Fraser (Rec. Ind. Mus. 26, 1924, p. 515 - 516, fig. 6 (wings) 7c-d (apps.), from Western India. Closely allied to *rapida*. — Size moderate: ♂ abd. + app. 34, hw. 30 mm. Discoidal field of both pairs of wings beginning with a single row of cells, to a level slightly before nodus. Two rows between anal loop and wing-margin. Body much as in *rapida*, abdomen black with clear yellow spots, rather similar to those of that species.

3. — *Macromidia shanensis* Fraser (Rec. Ind. Mus. 29, 1927, p. 67 - 68) from Upper Burma. — Size large: ♂ abd. + app. 38, hw 32; ♀ 36, 34 mm.

Discoidal field of front wing with a single row of cells to a level of inner end of bridge. Antenodals $\frac{15-17}{9-10}$ in both sexes. Thorax metallic-green with incomplete, citron-yellow antehumeral stripe and two lateral stripes of that colour. Abdomen black, with sharply defined, mid-dorsal spots and stripes on segm. 1 - 3 and 6.

4. — *Macromidia fulva* LAIDLAW 1915 (*loc. cit., antea*), from British North Borneo. — Size moderate: ♂ abd. + app. 35 - 37, hw. 32.5 - 35; ♀ 34.5, 35 mm. Two rows of cells in the discoidal field of front and hind wings, up to a level of the nodus. Three rows between anal loop and wing-margin. ♂ Antenodals $\frac{18-22}{11-12}$, ♀ $\frac{20}{10}$. Body-colouring pale brown; thoracic sides with two broad metallic green-brown bands. Abdomen brown, with pale brown rings.

5. — *Macromidia genialis* LAIDLAW (Journal Mal. Br. Roy. Asiatic Soc., 1, 1923, p. 232, pl. 5 (wings. genit.), from G. Tahan in Pahang, Malay Peninsula. — Size small: abd. + app. 30, hw. 27.5 mm. Female unknown. Only one row of cells in the discoidal field of both pairs of wings, to a level slightly before nodus. Two rows between anal loop and the wing-margin. ♂ Antenodals $\frac{15}{10}$. Dorsum of synthorax brown, sides metallic-blue with obscure brownish stripe along second suture. Abdomen entirely black, except on segm. 2.

6. — *Macromidia atrovirens*, of this paper, from Sumatra. — Size large: abd. 36, hw. 37.5 mm. Male unknown. Only one row of cells in the discoidal field of both front and hind wings, to a level slightly before nodus. Three rows between anal loop and wing-margin. ♀ Antenodals $\frac{19-20}{11-12}$. Body unmarked, dark in colour; thorax almost entirely metallic-green, abdomen throughout bronzy-black.

Except by its much larger size, this species differs from *genialis* by the higher nodal index, the wider and more closely reticulated anal area of the hind wing, and by details of coloration, especially of the head. Unlike *Macromia*, in the species of *Macromidia* venational differences between the two sexes are not very great, and therefore I feel myself justified to consider this species distinct from *genialis*.

Fam. GOMPHIDAE.

THE FORMENKREIS **Macrogomphus parallelogramma** (BURM.) (fig. 9 - 10).

In the following I have attempted to deal more thoroughly with two members of the genus *Macrogomphus* in Malaysia, viz. *parallelogramma* (BURM.) and *albardae* SELYS, which are among the best known of the genus and for this reason admit a closer study of their mutual relationship and geographical distribution. By the lack of material and sufficiently clear structural differences, systematic writers in the past had to depend largely on colour-differences and this has quite naturally resulted in the definition of a number of closely allied "species", which were often founded on specimens from different habitats (cf.

also *Ictinus, Onychogomphus*). The material examined consists of about 40 specimens of both sexes, mostly from Java, but also from Sumatra, Banka and Borneo. A study of these affords distinct evidence of the two "species" above referred to belonging to the same Formenkreis (*sensu* KLEINSCHMIDT!) [1]).

As has been pointed out on several occasions by various writers (RIS, Tijdschr. Ent. 55, 1912, p. 162; Ann. Soc. ent. Belg. 55, 1911, p. 238 - 239 — *albardae;* SCHMIDT, Arch. Hydrobiol. Suppl. 13, p. 364 - 365, fig. 67; LIEFTINCK, Misc. Zool. Sum. XCII - XCIII, 1935, p. 19), *M. parallelogramma* is an extremely variable species so far as colours are concerned, and the sexes are often very different (cf. also HAGEN-SELYS, Mon. Gomph. p. 90 - 92 sep. ♂ and p. 403-405 sep. ♀). The writer has examined 13 males and 17 females from different localities in Java, and a comparison of living specimens has definitely confirmed a previous supposition that different colour-varieties crop up in the same localities, so that it is evident that the palely and darkly coloured forms cannot be accepted as geographical subspecies. It is necessary to state this first, because we meet apparently with the same phenomenon in Sumatran *albardae*. For the present purpose it is sufficient to ascertain this amount of variability for the male only; the females may differ from each other in the same way, or even more so: darkly coloured individuals of that sex are indistinguishable from Sumatran and Bornean *albardae*.

The following five males are among the darkest of our series of Javan *parallelogramma*, and even these are all different *inter se:*

♂ ad., Soerabaia (East Java). — Ground-colour jet-black. Labrum black with two isolated yellow spots. No juxta-humeral yellow point. Met-

[1]) In dealing nomenclatorially with the nature of a species it appears to me highly advisable to emphasize also in the nomenclatorial formula the contrast which exists between the essential species, or F o r m e n k r e i s in LORENZ's sense (Szgsber. zool. bot. Ges. Wien 92, 1892) or in that of KLEINSCHMIDT (Die Formenkreislehre, 1926), and the less essential "cluster" of closely allied species; the second-mentioned can exist together without fusing: no other barriers keeping them apart than their own organization. The quite convenient term Formenkreis sensu LORENZ and KLEINSCHMIDT is adopted during the last decade by a great many systematists for those species which are liable to form subspecies (geographical or non-geographical races).

Although RIS, in his famous monograph of the *Libellulinae* used the trinomial system, thus adhering KLEINSCHMIDT's principle of defining syngenetic races as components of but a single species, he employed the term Formenkreis — a "cluster" or group of species — in a fundamentally different sense than KLEINSCHMIDT did.

In some of my previous papers on *Odonata* and in the present discussion of the Formenkreis *M. parallelogramma*, I have introduced this term to lay stress on a kind of geographical variation which is not easily understood; in many other cases the mutual relationship of a series of subspecies constituting a species, or Formenkreis, is much easier to ascertain (*e.g. Leptogomphus lansbergei* and its subspecies *assimilis*, *Neurobasis chinensis* and its subspecies *florida*), and in these instances the evidency of a Formenkreis being the same as our "species" needs no further comments. It is well known that many forms (in the commonest sense) now traced as subspecies have been regarded in the past as distinct though closely allied species, and the reverse, that forms now considered to be subspecies in the future might well be separated again and regarded as species. This, I think, ought not so much be a matter of convenience as of a profound study of relationships; the unstability of our conceptions goes on *pari passu* with new discoveries and a better knowledge of facts.

The use of the term Formenkreis as a "cluster of species" is useless and should be avoided; recently, SCHMIDT in his criticism of my treatment of the Formenkreis *Mesogomphus reinwardti*, has apparently misinterpreted the correct meaning of this term.

episternal stripe incomplete, distinct though narrow, cuneiform, almost reaching the spiracle. Occipital plate, vertex and legs black. The dorsally interrupted yellow rings on segm. 4 - 6 of abdomen occupy ca ⅓ of the length of each segment; 7 with sharply defined yellow ring, occupying slightly less than basal half of segment, narrowly divided above by a black median line; 8 with latero-basal yellow spots distinct. Remainder black.

♂ not fully ad. ? Mt. Slamat (Mid Java). — Ground-colour black. Labrum black with two large yellow spots, confluent along base. No juxta-humeral yellow point. Metepisternal stripe as before. Occipital plate black; vertex bright yellow behind. Legs black, hind femora dark chestnut-brown. Pterostigma black! Yellow rings on segm. 4 - 6 not extending beyond the transverse suture, occupying ca ¼ of the length of each segment; 7 with the basal half entirely yellow; 8 with a transverse yellow spot on each side at base, occupying less than ⅓ of the length; 9 with yellow basal points.

♂ ad., Mt. Slamat (Mid Java). — Ground-colour black. Labrum black with two isolated yellow spots, confluent along base. No juxta-humeral yellow point. Metepisternal stripe enlarged, reaching the spiracle. Vertex and occipital plate black. Legs entirely black. Yellow rings on segm. 4 - 6 enlarged, extending beyond the transverse suture for about 1 mm each; 7 as before, 8 with a basal point of yellow on each side; remainder black.

♂ ad., Malingping (West Java). — Ground-colour black. Labrum black, with two large isolated green spots at base. Postclypeus with 5 small greenish spots, 3 on middle, and 1 larger one placed on either side near the eye-margin. Vertex with a green spot behind the ocelli; occipital plate black. No juxta-humeral yellow point. Metepisternal stripe very narrow, obliterated (left side), entire and almost reaching the spiracle (right side). Legs black, all femora distinctly reddish-brown, knees black. Yellow rings on segm. 4 - 6 and 7 - 8 as before; remainder black.

♂ ad., Malingping (West Java). — Ground-colour black. Labrum black, with mere rudiments of two yellow points near base; clypeus jet-black. Vertex and occiput as before. No juxta-humeral yellow point. Ante-humeral stripes very narrow. Metepisternal stripe a mere comma-shaped rudiment, greenish in colour, placed in the upper corner of that space, and ill-limited ventrally. Yellow rings of segm. 4 - 6 narrow, not reaching beyond transverse suture; basal half of 7 yellow; remainder black.

This is the darkest specimen I have seen from Java.

The remaining specimens of our series are not fully adult, and in them the ground-colour of the body is brown, the markings being decidedly enlarged. Neither these nor any of the females have a juxta-humeral yellow spot in the upper corner of the thorax.

M. albardae SELYS (4. Add. Syn. Gomph. p. 416 - 418 sep.) was founded on a male from the island of Banka, collected by TEYSMANN, and hence was

erroneously reported from Sumatra (see: LIEFTINCK, Misc. Zool. Sum. XCII - XCIII, 1935, p. 19). The allotype female is from Lahat, in Palembang, S.E. Sumatra. Both specimens are still in the collection of the Amsterdam Zoological Museum. I have compared these types with other material from Java, Sumatra and Borneo.

The type of *albardae* is a darkly coloured specimen. SELYS's description of the occiput ("légèrement renflée en tubercule mousse au milieu") applies to a very slight thickening of the hind border, which is more or less developed throughout our series of specimens from Sumatra, Borneo and Java; it is of no specific importance. The principal differences between *albardae* and *parallelogramma* have been enumerated by DE SELYS at the end of his description of the first mentioned species. According to him, the pterostigma in *alb.* is longer than in *parall.*, the black markings on head and prothorax are more extensive, and there are no traces of an intercalated yellow fascia on the thoracic sides; in addition, the yellow rings of segm. 3 - 5 of abdomen are narrower and not confluent with the dorsal yellow stripe, and there are no basal yellow spots on segm. 8 and 9; lastly, the outer branches of the sup. anal apps. of the male are more pointed and almost wholly black.

Now, it is beyond doubt, that almost all of these supposed differences are subject to considerable variation, depending largely upon the phase of maturity arrived at by the living animal; only in a few cases the variability, especially of the thoracic colour-pattern, seems also to be due to post-mortem colour-changes.

Of Sumatra the writer has examined specimens from Deli (N.E. Sumatra), Palembang and the S. Lampoeng districts. The colours of the two extremes may be described as follows:

♂ ad. Lahat (Palembang). — Not different from pale-coloured *parall.* of Java. Ground-colour dark reddish-brown. Labrum yellow, broadly margined with black. Clypeus and vertical portion of frons brownish-black. Legs black, femora brown interiorly. A juxta-humeral yellow spot present (absent in the type from Banka!). Humeral stripe equal in width to lightly coloured *parall.* from Java, but distinctly narrower than in the type of *albardae.* Yellow metepisternal stripe very distinct, though narrow and cuneiform, reaching half-way down the spiracle. Yellow rings on segm. 4 - 6 conspicuous, surpassing the transverse sutures for about 1 mm, occupying the basal third of each segment. Ground-colour of segm. 9 - 10 brown, 9 without basal yellow spots.

♂ ad. Mt. Tanggamoes (Lampoeng). — Scarcely different from the darkest colour-variety of Javan *parall.*, but pale markings slightly more extensive. Markings of head and thorax olive-green. Labrum black with two large, isolated basal spots; clypeus and frons black, the postclypeus with merest rudiments of some greenish points. A very small juxta-humeral greenish point present on both sides. Antehumeral stripes narrow. Metepisternal fascia narrow but distinct, comma-shaped, confined to the upper

half of each episternite. Legs black, femora so much darkened as to be also nearly black. Ochreous-yellow rings on segm. 4 - 7 enlarged, indistinct dorsally, in side-view occupying nearly the basal half of each segment. Segm. 8 with a small yellow basal spot each side; 9 - 10 black.

The known Bornean specimens of *albardae* agree with typical *parallelogramma,* and with the type of Banka as well, in that a juxta-humeral yellow point is wanting, but in our Bornean males the ground-colour of the body is distinctly dark reddish-brown, except the mesepisternites, which are black. (See also RIS, Ann. Soc. ent. Belg. 55, 1911, p. 239). The labrum is reddish-black or reddish-brown, without distinct yellow spots, only the lateral edges being somewhat paler in colour. In this respect the type from Banka comes nearer to the Bornean form than to the Sumatran and Javan individuals. There are no traces of a pale metepisternal stripe. (Two adult males, W. Borneo, Singkawang, near Penaring, along small stream, Febr. 24, 1932, and in open country near the forest-marsh of Bakoean, Sept. 15, 1932, L. COOMANS DE RUITER leg.).

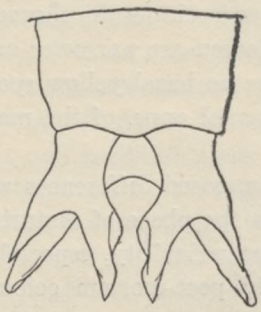


Fig. 9. — *Macrogomphus parallelogramma albardae* (SEL.), ♂ W. Borneo. Anal appendages, dorsal view.

As we have now seen, the differences between *parallelogramma* and *albardae* are very slight and unstable. The genital organs of the 2nd abdominal segment of the male are exactly identical, and the size is approximately the same throughout our series of specimens. The different size of the pterostigma, as mentioned by DE SELYS, is useless as a specific, or even subspecific character (♂ Java 3.75 - 4.40, ♀ 4.40 - 4.75; Banka ♂ 4, Lahat ♀ 4.50 mm).

In the writer's opinion, the only difference that may be relied upon as a character separating *albardae* from *parallelogramma,* is that found in the upper anal appendages of the male, and mentioned already by DE SELYS in the original description. In *parall.* the outer branch of the sup. apps. is only little shorter than the inner branch and at the same time slightly more robust and less acutely pointed (all specimens from Java and the two males from S. Sumatra), whereas in *albardae* the outer branch is slenderer, usually distinctly shorter than the inner, and very acutely pointed (type of Banka, ? Sumatra, and Borneo). This character, slight as it really is, may perhaps be used as a subspecific means of distinction between two geographically separated races, the males of which are generally to be recognized thus:

1. Ground-colour of the body of the adult male deep black. Pale markings on the black labrum well-defined, though often much reduced. Usually at least traces of an incomplete metepisternal yellow stripe. Appendages as above. Java, S.E. and S. Sumatra *parall. parallelogramma.*
2. Ground-colour of the body of the adult male dark reddish-brown, except on the back of synthorax. Labrum of the same colour, without sharply

defined yellow spots, though sometimes indistinctly green or yellowish on both sides. No traces of a metepisternal yellow stripe. Appendages as above (fig. 9). Penins. Siam, N.E. Sumatra, Banka, Borneo *parall. albardae.*

Although intermediate specimens are very likely to turn up in Sumatra, I would propose to retain the name *albardae* for the above defined subspecies.

Macrogomphus phalantus, sp.n. (fig. 10 - 12).

Material examined: 2 ♂, 1 ♀ (ad.), W. Borneo, Singkawang, swampy forest near Bakoean, low country, July 20 (1 ♂, "at dusk") and Sept. 15, 1932 (one pair, type and allotype), L. COOMANS DE RUITER leg.

Closely resembling *M. parallelogramma albardae* SELYS, but much smaller and with differently shaped anal appendages.

Male (ad., type). — Labium dirty ochreous; mandible-bases yellow. Labrum dark reddish-brown in the centre, growing paler laterally and along distal margin, so that two large but ill-defined ochreous spots are clearly discernible, each of them filling up the side-edges.; distal border fringed with golden hair. Anteclypeus greenish brown, postclypeus dark reddish-brown, except the side-edges which are yellowish-green. Frons in front blackish-brown; horizontal portion entirely bright green. Vertex and occiput reddish-black, unmarked. Behind the eyes chestnut-coloured.

Prothorax brownish-black, with the anterior border finely yellow and with a yellow point on the hinder part of the mid-dorsum; posterior border with some dark reddish points.

Synthorax throughout deep reddish-black, with well-defined dull greenish-yellow bands above and along the sides, as shown in fig. 10. Venter black. Lower lateral and ventral surfaces of thorax slightly pruinose blue.

Legs black; coxae brown and femora indistinctly reddish at base.

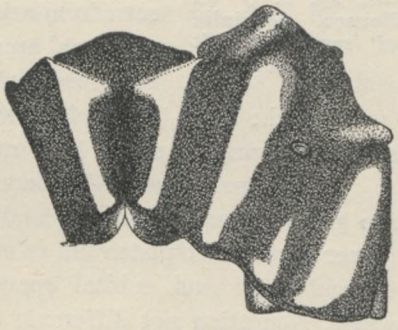


Fig. 10. — *Macrogomphus phalantus,* sp. n. ♂ W. Borneo. Colour-pattern diagram of synthorax.

Wings tinged with greyish-brown all over the membrane, especially at apices. Pterostigma very dark mummy-brown, unbraced, covering 4 - 5 underlying cells. Neuration very similar to *parallelogramma.* Anal loop consisting of but one small, roundish cell, and only one, slightly larger cell between this and the anal triangle. Three rows of cells between the proximal portion of Cu_2 and the wing-margin. Nodal index $\frac{10.17.17.11}{11.13.11.11}$. Additional *Cux* $\frac{2.2}{1.1}$. Anal triangle 3-celled. Triangle of front wing more transversely placed than that of hind wing, with costal side distinctly shorter than proximal side; triangle of hind wing normal.

Ground-colour of abdomen black; only segm. 1 is rather more brownish laterally. Segm. 1 with a mid-dorsal, dull-greenish spot and a large latero-ventral mark, indistinctly limited to above. Segm. 2 with a longitudinal mid-

dorsal mark of the same colour, which is suddenly narrowed at ⅔ of its length, running from end to end; a large green lateral spot, occupying the basal half of the segment and including the auricles, and a short, isolated, transverse side-stripe along the distal margin. Auricles as in *p. albardae* but more rounded.



Fig. 11. — *Macrogomphus phalantus*, sp. n. ♂ W. Borneo. Genitalia of segm. 2, left side-view.

Segm. 3 - 7 with complete, dull orange basal rings, occupying slightly over ¼ of the length of segm. 3 - 6, quite half the length of segm. 7, the ring on 7 being divided longitudinally by a fine black dorsal line. Segm. 8 - 9 reddish-black, 8 with an ill-limited latero-basal ochreous spot, and 9 with a similar but still smaller spot on either side at base. Segm. 10 reddish-black, with traces of two reddish spots on mid-dorsum.

Genitalia: identical in shape to *parallelogramma* and its subspecies *albardae*, though all parts comparatively smaller. Anterior lamina rounded in side-view. Anterior hamuli resting upon the ventral process of the penis, which is only partly visible; each is slender, hollowed out ventrally, and much more projecting than the anterior lamina. Posterior hamuli of about the same length, lateral margins of each rather irregularly denticulated and curled anterad, when seen from aside (fig. 11).

Anal appendages (fig. 12), superior pair yellow, the inner branches almost black. Inferior appendage black.

Length: abd. + app. 40.5, hw. 33 pt. 4.1 mm. Length of segm. 8 3 mm, of segm. 9 6 mm, of segm. 10 1 mm.

Male (paratype). — Differs from the type only in that the mandible-bases are green instead of yellow, and in that the comma-shaped spot in the upper corner of the metepisternum is effaced. There are dirty ochreous basal rays in the subcostal and cubital spaces of the wings. Neuration not different; additional *Cux* $\frac{2\,3}{2.2}$.

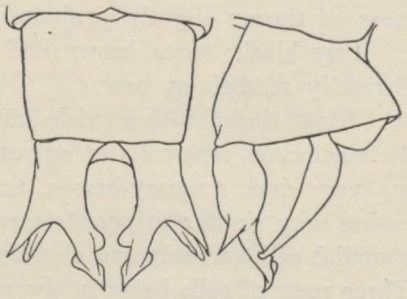


Fig. 12. — *Macrogomphus phalantus*, sp. n. ♂ W. Borneo. Anal appendages, dorsal view and right side.

Length: abd. + app. 41, hw. 34.5 mm.

Female (ad., allotype). — Differs slightly from the male, as follows:

Colouring of the anterior surface of head somewhat lighter, olive-brown; pale markings dull green. Occipital lamina produced behind, forming a distinct median projection, which itself bears two small and closely approximated knob-like tubercles. Pro- and synthorax dark purplish-brown; markings not different from the male, bright yellow instead of green.

Wings slightly greyish-yellow with short yellow rays in *sc* and *cu*. Nodal index $\frac{13.18\,18\,11}{10.13.12.11}$. Additional *Cux* $\frac{2.2}{1.1}$.

Abdomen similar to the male; segments 3 - 7 in addition to the yellow basal markings with mid-dorsal yellow line. Side-spots of segm. 2 - 3 enlarged, those on 2 covering most of the sides, those on 3 approximately their basal half. Segm. 8 black, unmarked, 10 and appendages pale brown.

Genital valve not developed, margin very slightly notched at middle.

Length: abd. 43, hw. 35, pt. 4.3 mm.

Of the genus *Macrogomphus*, all known Bornean species are represented in the collection of *Odonata* made for me by Mr. COOMANS DE RUITER, and all of these were taken in the hill-country around Singkawang. These species are *M. parallelogramma albardae* SELYS, *M. decemlineatus* SELYS, and *M. quadratus* SELYS.

The male of the above described *M. phalantus*, though undoubtedly nearly related to *parall. albardae*, differs very markedly from that species by its much smaller size, and by the curious shape of its upper anal appendages. It is further distinguished by the shorter discoidal triangle of the front wing, by the narrower and almost parallel-sided yellow bands on each side of the thorax, and by the more widely separated and more obliquely placed antehumeral thoracic stripes. The shape of the inner branch of the sup. anal apps. of the male rather suggests *M. borikhanensis* FRASER, from the Laos country (Journ. Siam Soc. Nat. Hist. 9, 1933, p. 136 - 139, fig. 8, apps. ♂). Among other characters this species is well distinguished from *phalantus* by its superior size, and by the interrupted yellow band on the dorsal surface of the frons.

The female of our new species is easily separated from *parall. albardae* by the bifid median prominency on the occipital plate.

The three species have the following measurements:

M. borikhanensis (Laos): ♂ abd. + abd. 57, hw. 40 mm.
M. parall. albardae (W. Borneo): — 49 - 50, hw. 42 mm.
M. phalantus (W. Borneo): — 40.5 - 41, hw. 33 - 34.5 mm.

Acrogomphus walshi, sp.n. (fig. 13 - 15).

Material examined: — 1 ♂ (ad.), S. Sumatra, Benkoelen residency, Moeara Tenam, ca 250 m alt., June 16 - 23, 1925, M. E. WALSH leg.

M a l e. — Labium greenish-yellow. Base of mandibles, labrum and anteclypeus green. Basal third of the labrum reddish-brown, this colour ill-limited anteriorly; distal margin finely black. Genae greenish-brown. Postclypeus, vertical portion of frons and vertex reddish-brown; upper surface of frons bright greenish-yellow, with an indistinct reddish-brown stripe along base. Vertex low, each of the lateral ocelli placed upon a low tubercle whose margins are distinctly raised. The occipital quadrangle bears a minute median tubercle, the blackish hind-border of which is a little swollen.

Prothorax warm reddish-brown above, paler alongside. Ground-colour of synthorax warm purplish-brown with clear yellowish-green markings, as shown in fig. 13. Antehumeral bands widened ventrad, narrowly separated from one another.

Legs very short; femora swollen, widest on middle. Femora ochreous, exterior surfaces with a thick black stripe, knees also darkened; tibiae and tarsi black.

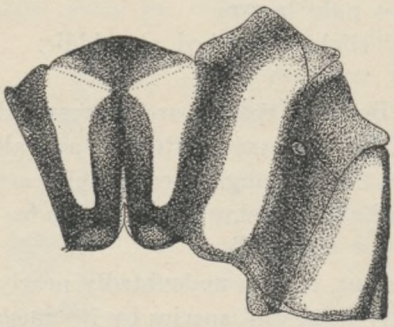


Fig. 13. — *Acrogomphus walshi*, sp. n. ♂ S. Sumatra. Colour-pattern diagram of synthorax.

Wings almost hyaline, membrane palest yellow only in the costal and cubital spaces of the proximal half of both wings. Pterostigma dark sepia-brown, braced, covering 5 - 6 cells. Neuration very similar to *A. malayanus*. Two rows of cells in the discoidal field of front wing to a level beyond the nodus. In left front wing however, there are 2 cross-veins, and in the right one 1 such a vein, in the proximal third of the discoidal field, running directly from M_4 to Cu_1. Discoidal field of hind wing also with 1 - 3 of such simple connecting-veins in the proximal third. Nodal index $\frac{11\ 17.17.11}{10\ 13\ 13.11}$. Cross-nerves between M_{1+3} and M_4 $\frac{4.5}{3.3}$. Basal half of hind wing broader than in *malayanus;* anal loop one- or two-celled (left and right side); three rows of cells between Cu_2 and the wing-margin. Anal triangle exactly as in LAIDLAW's photograph of the wings of *malayanus*.

Abdomen very slender; proximal segments somewhat widened in both dimensions; lateral margins of 8th and 9th segments distinctly exfoliated, these segments rather much widened in both dimensions. Colouring brownish-black. Dorsum of segm. 1 - 2 largely yellow, the marking on the back of 2 constricted behind middle; sides, including the auricles, also yellow anteriorly. Basal four-fifth of segm. 3 with a dorso-lateral ochreous marking, which is finely interrupted on middle by the transverse carina, the basal portion being divided into two by the black longitudinal carina. Segm. 4 with these spots similar but smaller; 5 and 6 with paired dorso-lateral spots occupying only the basal fourth of each segment. Segm. 7 with a large yellow mark, divided into two portions by a fine mid-dorsal line of black, and occupying slightly less than the basal half of the segment. Sides of 8 and 9 each with anterior and posterior marginal spots, the latter extending upwards and bordering the hind margin. Segm. 10 black.



Fig. 14. — *Acrogomphus walshi*, sp. n. ♂ S. Sumatra. Genitalia of segm. 2, left side-view; penile organ extruded (dotted).

Anal appendages black, shaped as in the sketch.

Genitalia of segm. 2: hamulus small and slender; vesicle of penis moderately large, broadly ovate, more projecting than the hamule.

Length: abd. + app. 32, hw. 28.5, pt. 3 mm.

I have much pleasure in naming this new species for Mrs. M. E. WALSH, the well-known lepidopterist of Soekaboemi, who has contributed largely to our knowledge of the Malaysian insect-fauna.

The species of *Acrogomphus* already known are few in number and mostly described from few individuals:

1. — *A fraseri* LAIDLAW (Proc. Zool. Soc. London, 1925, p. 441 - 443) was described from South India; both sexes are known. Among other characters the male differs from the other species by its larger size (abd. 43.5 - 44, hw. 38 - 38.5 mm). The antehumeral thoracic stripes are small, wedge-shaped and incomplete above and below. Segm. 3 - 6 of the abdomen are black with small apical dorso-lateral spots of yellow. The vein Cu_2 in front wing markedly pectinate, having several distinct branches; the anal triangle is 4-celled.

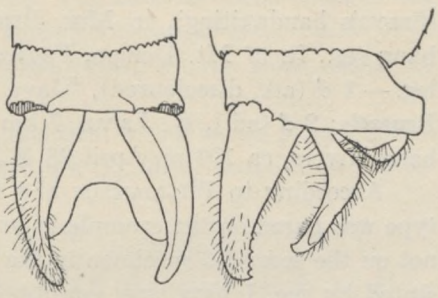


Fig. 15. — *Acrogomphus walshi* sp. n. ♂ S. Sumatra. Anal appendages, dorsal view and right side.

2. — *A. malayanus* LAIDLAW (P.Z.S., loc. cit. p. 443 - 444, fig. 1 (wing) was described from Pulau Aor, off the E. Coast of Johore, Malay Peninsula. Only the type male is known. It is much smaller than *fraseri* (abd. 33.5, hw. 29 mm), but the thoracic markings are very similar to that species. The yellow spots on the abdomen are more extensive. The neuration of the wings very different from that of *fraseri*.

3. — *A. walshi*, of this paper, is from Sumatra, and differs from all other species by the broad, complete antehumeral bands of the thorax, which are confluent with the mesothoracic collar. It is of about the same size as *malayanus*, but, in addition to the venational characters, *walshi* differs from that species in the much more extensive yellow markings of the abdomen.

4. — *A. minor* LAIDLAW (Journal F.M.S. Museums, 16, 1931, p. 215 - 217) is from Selangor and Peninsular Siam. The male measures: abd. + app. 35, hw. 25 mm. According to LAIDLAW this is probably only a subspecies of *Onychogomphus circularis* (SELYS), from Nepal and North India. This species is entirely different from the preceding ones by the curious shape of the male's upper anal appendages, whose apices are abruptly curved downwards. On the back of the synthorax there is a pair of oblique antehumeral bands, incomplete above and below, and to the outside of these, on either side, a small, linear, humeral mark of yellow.

Megalogomphus icterops (MARTIN).

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1904. MARTIN, Mission Pavie, p. 9 sep. — ♂ Java (*Heterogomphus*).
1907. WILLIAMSON, Proc. U. S. Nat. Mus. 33, p. 318, diagn. (*Heterogomphus*).
1914. LAIDLAW, Proc. Zool. Soc. London, p. 57 - 58, pl. 1 f. 3 (insect). — ♂ Sarawak (*H. ict. borneensis*).

1922. LAIDLAW, Rec. Ind. Mus. 24, p. 413. — Java, Borneo (*Heterogomphus*).
1934. SCHMIDT, Arch. Hydrobiol. Suppl. 13, p. 376 (key), 377, fig. 89, 91 & 92 (♀ structures). — ♀ Java (allotype).
1934. LIEFTINCK, Treubia, 14, p. 438, 461, notes. — ♂ Java, Borneo.

Material examined: — 1 ♂ (ad., colours faded), Borneo: "Sarawak" (SELYS's handwriting), in Mus. Brussels. — 1 ♂ (ad.), S. Sumatra, Palembang res., ft. of Mt. Dempo, Pageralam, 700 m, May 23, 1935, M. E. WALSH leg. — 1 ♂ (ad., discoloured), "Java Fr. (UHSTORFER)" (SELYS 's hand), in Mus. Brussels; 2 ♂ (ad.), W. Java, 7 km W. of Djasinga, Tjibeureum & Tjibarangbang Rivers, ca 150 m, April 28 & 30, 1935, L. J. TOXOPEUS & AUTHOR leg.

According to WILLIAMSON and LAIDLAW, MARTIN's brief description of the type was based on the example in DE SELYS's collection in the Brussels Museum, not on the second ♂ specimen in the Paris Museum, as was perhaps erroneously stated by me. I have now confronted this typical example with a male from Sarawak in the same collection, identified by DE SELYS as *icterops*, and I have failed to discover any appreciable differences between these two males, which are of the same size and colouring.

LAIDLAW's ♂ from Matang Rd., in Sarawak, is doubtlessly an aberrant specimen, whose wing-neuration, according also to LAIDLAW, would seem to have undergone considerable artificial modification during development. Our specimen from Sarawak does not show any such irregularities in the venation, and, moreover, is so similar to our specimens of Java and Sumatra, that I would suggest to withdraw the subspecies-name *borneensis*, proposed by LAIDLAW for the Bornean form of *icterops*.

Like the other Museum-specimens, the colours of the ♂ from Sarawak, which is fully mature, have lost their freshness and are faded dirty yellowish. The wings of this ♂ are irregularly cloudy-yellow all over the membrane. Neuration as in the Javan type: *pt* braced, ochreous between black nervures. All *t*, *ti* and *ht* free. Only one *Cux* in all wings. Anal loop 2-celled. Anal triangle 4-celled (incl. one small marginal cell half-way its length). Nodal index $\frac{11.16.17.12}{11.12.13.12}$ Otherwise agreeing in all respects with LAIDLAW's description. [A slight error has crept in this author's statement of body-measurements: for "abdomen without appendages 51 mm", read: "*with* appendages"].

The living male of *M. icterops* is a very handsomely coloured insect; all pale markings, including the entire anterior surface of the head, are of a bright apple-green; this colouring strongly contrasts with the deep reddish-brown bands of the thorax and most of the abdominal segments.

All of our specimens agree in having the mahagony-red, or chestnut-coloured humeral and metepisternal bands of the thorax wider than in the ♀, described by SCHMIDT; the humeral band does not occupy more than two-fifths of the width of each mesepisternite and the lateral fascia is also narrower [1]). The

[1]) This difference is perhaps due to the thoracic segments in SCHMIDT's diagram of the thorax being somewhat disproportionately rendered; the mesothoracic spiracle is situated much nearer to the 2nd lateral suture.

dorsum and sides of abd.-segm. 1 - 3 are spotted and striped with green. The ground-colour of 4 - 6 is mahagony-red and each of these segments, besides bearing a fine, interrupted longitudinal pale line over their middle, is adorned with a diffuse yellow streak over the transverse carinae, the jet-black apical rings being rather unsharply limited anteriorly. The anterior three-fifths of the dorsum and sides of segm. 7 carries a very conspicuous apple-green mark; 8 - 9 are dark brown above, ferruginous or Sanford's brown on the sides; segm. 10 and appendages lighter brown.

The genitalia and anal appendages are identical in our series of specimens, the latter being very similar in form to Schmidt's fig. 90 of those of *M. sumatranus* (Krüg.) (loc. cit. p. 376).

There are from $\frac{14-16}{10-13}$ antenodals, and $\frac{10-12}{10-12}$ postnodals.

Measurements: abd. + app. 46, hw. 43, pt. 4.8 (Sumatra); 47.5 - 51, 41.5 - 44, 4.5 - 4.8 (Java); 47.5, 43, 5 mm (Borneo).

Mrs. Walsh's find of this conspicuous Gomphid in the jungle of South Sumatra took place almost simultaneously with its re-discovery in Java, and both of these discoveries are of considerable interest. *H. icterops* was not previously known from Sumatra, the only species found there being *H. sumatranus* (Krüger), which occurs in Upper Langkat and near Soekaranda, in Deli (North East Sumatra).

Near Djasinga, about 30 miles West of Buitenzorg, we first noticed the occurrence of *icterops* at the end of the rainy season, over two deeply recessed streams, which flow slowly through secondary and recently cleared forest. In the wet season months these low-levelled streams are roaring rivers, but from the outset of the dry monsoon the watermark sinks considerably, and the beds are then seen to consist partly of slate-rock deposits which, at the shallow stretches of the river, are coloured bright green by the slithery substance of *Spirogyra* covering the rocks; the bed of other portions of the river is composed of coarse sand and gravel-banks. *H. icterops* was first noticed in April, 1935, the last individuals struggling into July. It was exceedingly scarce and localized to such points where the current was swift and rippling over a bed of pebbles. The males have a rapid flight, low over the water, and when skimming the green rocks, are all but invisible; this may partly account for so striking and beautiful insect not having been discovered before. The female was not observed and no larvae could as yet be found.

Other *Gomphidae* captured in the bed of the Tjibarangbang were *Ictinus decoratus* Sel., *Gomphidia javanica* Först., *Macrogomphus parallelogramma* Sel., *Leptogomphus lansbergei* Sel., and *Mesogomphus reinwardti* (Sel.).

SKORPIONE VON KRAKATAU UND DEN BENACHBARTEN INSELN.

Von

Dr. F. KOPSTEIN
(Magelang, Java).

In den bisherigen Mitteilungen über die neue Fauna von Krakatau fehlen die Skorpione völlig. Wohl erwähnt DAMMERMAN in "Krakatau's new fauna" (Fourth Pacific Science Congress; Krakatau; pag. 113), dass von dieser Insel 1 Skorpion bekannt wäre, ohne jedoch die Art zu nennen. Inzwischen sandte mir Herr Dr. K. W. DAMMERMAN die auf Krakatau gesammelten 3 Skorpione zur Bestimmung, so dass ich nun in der Lage bin, einiges darüber mitzuteilen.

Chaerilus variegatus nigricolor Poc.
Krakatau; IV. 1933; DAMMERMAN leg.; Zoologisches Museum Buitenzorg. 1 ad. ♀; 1 s.ad. ♀.

Area vor dem Augenhügel bei dem ad. ♀ schwach gekörnt, wesentlich schwächer als bei *Chaerilus variegatus variegatus* E. SIM. von Java; bei dem s.ad. ♀ beinahe glatt. Abdomen oberseits feinkörnig. Höcker am Hinterrand der Abdominalsegmente schwach angedeutet, manchmal mit je einem Haare versehen. Handballen deutlich kleiner als bei der javanischen *variegatus*-Rasse, seine Flächen deutlich schwächer und feiner gekörnt. Kz. 6/6; 6/6.

Oberseite einfärbig dunkel, beinahe schwarz. Tarsenendglieder und Unterseite lichter, bräunlich.

Das dritte Exemplar, ein sehr junges ♀, von Dr. DAMMERMAN im Südosten der Insel, im Jänner 1933 gesammelt, ist hell gelbbraun mit zahlreichen, kleinen, dunklen Flecken. Die Zahl der Kz. beträgt auch hier 6/6. Da bei diesem sehr jungen Stück die morphologischen Merkmale noch nicht ausgebildet sind, lässt sich vorläufig nicht entscheiden, ob es sich um die Jugendform von *Ch. variegatus nigricolor*, oder um die Stammform handelt.

Chaerilus variegatus variegatus ist bisher von Java, Borneo und Flores bekannt; ferner von den Inseln Nias, Bangka und Sebesi. GILTAY nennt in "Memoires du Musée Royal d'histoire naturelle de Belgique" (Résultats Scientifiques du Voyage aux Indes Orientales Néerlandaises de LL.AA.RR. le Prince et la Princesse LÉOPOLD de Belgique) Vol. III, fasc. 6; 1931; pag. 19 auch Sumatra, woher mir aber bisher kein Material bekannt ist.

Chaerilus variegatus nigricolor wurde ausserhalb von Java noch nicht gefunden.

Tiergeographisch gestattet dieser Fund vorläufig keine Besprechung. Import mittels Treibholz erscheint am meisten wahrscheinlich, wobei wir jedoch an-

merken müssen, dass die Biologie von *Chaerilus variegatus* gegenwärtig noch gänzlich unbekannt ist.

Von den Krakatau benachbarten Inseln sind die folgenden Arten bekannt:

Lang Eiland:

Lychas mucronatus (F.); DAMMERMAN leg.; I. 1933; Zoologisches Museum Buitenzorg.

1 ad. ♂; Kz. 23/23; Lobus des beweglichen Fingers klein.

1 ad. ♀; Kz. 22/21.

Sebesi:

KOPSTEIN; Liste der Skorpione des indo-australischen Archipels im Museum zu Buitenzorg; Treubia; III; 1923; pag. 185.

Chaerilus variegatus variegatus E. SIM.

Hormurus australasiae (F.)

ON SOME NEW SPECIES OF *CARABIDAE*, CHIEFLY FROM JAVA (II).

By

H. E. ANDREWES (London).

In a former paper in this Journal (Vol. xiv. 2. 1933, pp. 273-286) I described some new species of *Carabidae* largely from the collection of the Buitenzorg Museum. In this second paper will be found the descriptions of seventeen new species and two varieties, all from Java, three of them from the Buitenzorg Museum, but all the rest from the collection of Mr. C. J. LOUWERENS of Toeloengagoeng, who, like the Director, of the Buitenzorg Museum, has kindly allowed me to retain the type specimens in my own collection; cotypes have been deposited in the collection of the Buitenzorg Museum and in Mr. LOUWERENS's collection. Where no other name appears, it should be understood that Mr. LOUWERENS was the collector.

Two genera of which new species are here described are new to Java, viz. *Ancus* and *Mastax*, but, whereas the former was previously unknown in the Malay Archipelago, a species of *Mastax* was already known from Sumatra.

Amongst the insects collected by Mr. LOUWERENS were two examples of *Scarites macleayi* ANDR. (= *S. indus* MACL. (nec OLIV.)), a species of which the only example previously known is the type specimen found by Dr. HORSFIELD between 1812 and 1817. Very nearly all the forty-two species of *Carabidae* enumerated and described by W. S. MACLEAY in his "Annulosa Javanica" (1825) have now been rediscovered, but the genotype of *Colpodes*, viz. *C. brunneus* MACL., is, so far as I know, still represented by the solitary type in the British Museum.

Clivina ephippiata PUTZEYS, Mon. des Clivina et genres voisins, Mém. Soc. sci. Liége ii. 1846, p. 602.

The species was described from Java, and has been met with also in Celebes and in Australia. Mr. LOUWERENS has found examples at Toeloengagoeng, Bandoeng, and Gambiran (Residency Kediri). In this typical form the head and prothorax are black, the elytra ferruginous, with a large black common apical patch. Mr. LOUWERENS has also come across two other forms of the species, which I can distinguish only by differences in colour, but these are so striking that it seems desirable to give each form a name.

var. **picina** var. nov.

In this form the prothorax is very dark red, the head and elytra piceous, the latter with the marginal channel ferruginous.

Residency Kediri: Bojolangoe, 1 ex.

var. **flavida** var. nov.

Here the head and prothorax are brown, the elytra uniformly pale ferruginous.

Residency Kediri: Bojolangoe, 1 ex.; Toeloengagoeng, 3 ex.

Ancus cariniceps sp. n.

Length: 4 mm.

Light brown: palpi, antennae, tibiae, and tarsi pale ferruginous.

Head small, concave, with moderately prominent eyes, median part of clypeus transversely raised, with a sulcus in front, the margin finely quadridentate, the wings projecting a little on each side as a blunt tooth, frontal plates slightly emarginate at sides, an oblique carina running forward on each side from hind-eye level, the two carinae converging towards, but not quite meeting on middle of front, the space behind the carinae hollowed out, though not very deeply, frontal impressions only moderately deep, extending back as far as the base of the carinae and outside them, neck constriction formed by a few punctures only at sides, surface fairly closely punctate, lightly in front, neck smooth, antennae moniliform, joints 1 and 2 much longer than the other joints. *Prothorax* convex, nearly a half wider than head, a little longer than wide, sides parallel, a very slight tooth on each side at hind angles, the large pore distant from side; median line deep, front transverse impression slight, two irregular, longitudinal rows of pores running down each side of disk, but not reaching base, a third short row of pores running between the other two on the basal third only. *Elytra* convex, as wide as prothorax, more than twice as long as wide, sides parallel; striae deep, finely punctate, 1 to 3 free at base, 4 to 6 joining behind shoulder, striole slight; intervals convex, 3 with four indistinct pores adjoining stria 3. No microsculpture. Sterna punctate at sides, prosternal process narrow and slightly sulcate. Venter coarsely punctate, the pores on the apical segment distant. Profemora dilated and toothed beneath, protibiae not sulcate, each with three long digitations and an upper tooth, the apical digitation a little longer than the spur, mesotibiae with a well-developed spur.

This South American genus has at present only one described Old World representative, viz. *A. excavaticeps* PUTZ. from Siam and Indo-China. The new species agrees with this closely in colour, size, and general form, though the prothorax is evidently longer. The surface and form of the head are, however, entirely different and it will easily be separated by the converging carinae on the head, the quadridentate clypeus, and the much more extensive puncturation.

Residency Kediri: Balor, 1 ex.

Dyschirius laeviceps sp. n.

Length: 2.4 - 2.6 mm.

Brassy: palpi, joints 1 to 4 of antennae (rest fuscous), tibiae, and tarsi pale ferruginous, femora and apical border of the elytra a little darker.

Head with the clypeus convex, bordered and truncate in front, each end projecting forward as a large, wide, blunt, triangular tooth, clypeal suture very deep, joining the deep facial sulci, which curve round on each side behind the eye, neck constriction obsolete in the type, more evident in the cotype, surface on each side between sulcus and eye uneven, surface generally very smooth. *Prothorax* globose, a fourth wider than head, and as long as wide, widest at middle, lateral border hardly extending beyond hind lateral pore; median line visible at extremities only, transverse sulcus deep and crenulate. *Elytra* convex, subovate but with square shoulders, base unbordered, about a fourth wider than prothorax, a half longer than wide; striae fairly deep and conspicuously punctate, 1 entire, shallower towards apex, arising on each side in an umbilicate basal pore, the other striae shortening outwards and leaving the apex smooth, 8 represented by two or three very small pores in front, but deep near apex, two apical and three subhumeral pores; intervals convex on disk, 3 with three pores on the interval, surface very smooth, without microsculpture. The protibiae have only one slight external spine, and the apical digitation is much longer than the spur.

This species must be very near the North Indian *D. indicus* Putz., but it differs in colour, in the proportions of the different parts of the body, etc. From *D. rugifrons* Andr., the only other Javan species hitherto described, it differs in the form of the head, the shortened elytral striae, and the presence of three pores (instead of five) on interval 3.

Residency Kediri: Pakel, 1 ex.; Bojolangoe, 1 ex.

Tachys venustus sp. n.

Length: 3.5 mm.

Ferruginous: elytra with a large oblong discal spot, just reaching base and connected along the two inner intervals with a small common apical spot, border, and interval 9 black.

Head small, with deep furrows, diverging behind, eyes moderately prominent, mentum with two pores, antennae filiform, joint 2 not much longer than 3. *Prothorax* cordate, nearly a half wider than head and about as much wider than long, base wider than apex, sides rounded, sinuate close to the hind angles, which are sharply rectangular, with a slight carina on each side and a notch in front corresponding with the hind lateral pore; median line moderately deep, basal sulcus deep, crenulate, practically uninterrupted, but with a small pore behind it, forming a continuation of the median line. *Elytra* moderately convex, about a fourth wider than prothorax, three-fifths longer than wide, border not dentate and only vaguely setulose, rounded at shoulder and extending inwards a little beyond the base of stria 4; fully striate, the striae finely punctate, 1 to 4 moderately impressed, 5 to 8 progressively fainter, 1 and 2 reaching apex, where 2 diverges from 1 and runs parallel with the striole, 8 deep behind, striole a little curved, hooked in front, on middle of elytron, the pore close to apex; front dorsal pore on interval 6 at about a fifth from base, hind one in

the hook of the striole. Microsculpture of the prothorax and elytra formed by very fine transverse lines; on the head it is reticulate and formed by nearly isodiametric meshes. Prosternum slightly sulcate; metasternal process bordered; protarsi ♂ with two strongly dilated joints.

A little larger than *euryodes* BATES, but similarly coloured, except that the elytra are mainly black; the prothorax is a little wider and there is a small but quite evident pore behind the middle of the basal sulcus; the elytra are fully striate, the striae punctate (in *euryodes* finely crenulate, though in my "Revision of the Oriental species" I said they were not), the inner ones rather deeper, the outer ones more evident.

Residency Kediri: Blombang, 1 ex., and Gambiran, 2 ex.; Zuider Geb.: Popoh, 3 ex.; Goenoeng Kloet, 1 ex.; Toeloengagoeng, 1 ex.

Tachys lembodes sp. n.

Length: 3.0 - 3.5 mm.

Flavous: middle of under side and venter more or less brown; head, front and hind margins of prothorax, and elytra dark bronze, each elytron with two small, marginal, flavous spots, the front one triangular, just behind shoulder, the hind one elongate, close to apex.

Head with short, shallow furrows, eyes rather prominent, mentum without pores, antennae subclavate, joints 2 and 3 of equal length. *Prothorax* quadrate, a half wider than head, a third wider than long, widest at base, which is exactly adjusted to the base of the elytra, and slightly produced at middle, apex emarginate, the front angles fairly sharp, sides rounded in front, nearly straight behind, hind angles slightly obtuse, though sharp, with a rudimentary carina; median line very fine, front transverse impression obsolete, basal sulcus moderately deep, crenulate, interrupted at middle by a fairly wide depression, which is bounded on each side by a slight longitudinal ridge, outside which is some further slight striation, basal foveae moderately impressed, rounded, midway between median line and hind angles. *Elytra* convex, elongate, quite a fourth wider than prothorax, three-fifths longer than wide, widest a little behind shoulders and tapering gradually to apex, border smooth, forming a very obtuse angle at shoulder and continuing a little way inwards in the direction of the scutellum; striae vaguely crenulate, striae 1 to 3 very faint in front, 1 only reaching base, but all three very deep near apex, where 3 joins the recurved striole, stria 4 just visible behind, striae 5 to 7 wanting, 8 deep on apical half, represented in front by three small pores just behind shoulder, and another larger one at a fourth from base, between which and middle the stria is just traceable, two dorsal pores on stria 3 at a third and three-fourths. Microsculpture formed by isodiametric meshes, very distinct throughout. Metasternal process depressed and finely bordered; apical ventral segment ♂ with two pores, ♀ with four pores, close together, in a straight line, and near the margin. In the ♂ the protarsi are hardly dilated.

South Java: Residency Banjoemas, Babakan, 27.iii.1933 (F. C.

DRESCHER and M. A. LIEFTINCK), 7 ex. "Beach". I had already seen other examples of this species, and have three specimens in my own collection.

This species, *T. gestroi* ANDR., and *T. horni* ANDR. form a small homogeneous group characterized by an elongate-oval form, a conspicuous isodiametric microsculpture, the elytra with two dorsal pores, stria 8 deep on the apical half, but represented by a few pores in front, the other striae obsolete, though 1, 2, and sometimes 3 are developed on the apical half. The three species may be distinguished as follows:—

1(4)	Prothorax with a depression at the middle of the basal sulcus, bounded on each side by a longitudinal ridge. Elytra with at least some dark markings.	
2(3)	Prothorax without a carina in the hind angles. Elytra flavous, with a hastate piceous spot at middle. (Mentawei Is.).	*gestroi* ANDR. [1]
3(2)	Prothorax with a rudimentary carina in the hind angles. Elytra dark bronze, each with two small flavous spots (Java).	*lembodes* sp. n.
4(1)	Prothorax with a normal, lightly impressed, basal sulcus, uninterrupted at middle. Elytra flavous, each with a large pale spot near apex (Ceylon).	*horni* ANDR. [2]

Callistomimus trichros sp. n.

Length: 4 mm.

Underside black, upper surface blue black, the elytra with some faint greenish reflections on the apical half; labrum, palpi (fuscous at apex), and legs (except knees, and apex of tibiae and tarsal joints) yellowish white; joints 1 and 2 of antennae more or less ferruginous; base of prothorax (narrowly), and a large scutellum shaped spot at the base of the elytra, reaching middle and extending on each side to stria 5, red; two small fasciae on each elytron, the front one from stria 5 to margin, where it extends a little both forward and backward, the hind one between striae 4 and 8, a small spot on interval 3 behind the red patch, and another small sutural spot a extreme apex, white. Body with a short pubescence.

Head punctate, clypeus, disk, and neck smooth, eyes fairly prominent, antennae thick and dilated towards apex. *Prothorax* convex, cordate, only a little wider than head, nearly a third wider than long, apex a fourth wider than base, sides rounded in front, strongly contracted behind, hind angles each in the form of a small, sharp, slightly acute tooth; median line impressed on basal half only, basal foveae moderately deep, surface closely punctate. *Elytra* a little convex,

[1] Ann. Mus. Civ. Gen. li. 1925, pp. 382 and 384, t. 3. f. 5.
[2] Faun. Brit. Ind. Carab. ii. 1935, pp. 234 and 235, f. 41.

subquadrate, slightly dilated behind, two-thirds wider than prothorax, a third longer than wide; punctate-striate, intervals moderately convex; surface dull, finely punctate. Microsculpture of elytra isodiametric, none on head, and none visible on prothorax. Underside finely and fairly closely punctate.

In my key to the oriental species of this genus (Proc. Zool. Soc. Lond. 1921, p. 236), this new one will come near *quadricolor* PUTZ. (= *eucharis* BATES), but the prothorax is blue black instead of red, and its hind angles are much smaller.

Residency Kediri: Bandoeng, 1 ex.; Bojolangoe, 1 ex.; Srabah, 1 ex.; Toeloengagoeng, 1 ex.

Chlaenius philemon sp. n.

Length: 11.5 - 12 mm. Width: 4.2 - 4.3 mm.

Black, shiny; head and prothorax metallic green, the head bluish in front; basal joint of palpi, joints 1 to 3 of antennae, labrum, legs, interval 9, border, and epipleura of elytra flavous; rest of palpi and antennae ferruginous.

Head with the frontal furrows shallow, subrugose, some fine longitudinal striation in them and on vertex, one or two fine punctures at sides behind, eyes prominent, labrum truncate, antennae rather thick, reaching middle of elytra, joint 3 half as long again as 4. *Prothorax* convex, cordate, a little more contracted in front than behind, as wide as head, about a fourth wider than long, sides narrowly bordered, rounded, gently sinuate close to base, hind angles right, but not sharp, a setiferous pore just in front of each; median line and transverse basal sulcus both fairly deep, basal foveae rounded, rather small but deep, surface moderately, irregularly, and rather sparsely punctate, basal area minutely rugose. *Elytra* convex, ovate, shoulders oblique, the border forming a very oblique angle on each side above them, two-thirds wider than prothorax, three-fourths longer than wide; striae deep and finely yet conspicuously crenulate, with a row of minute punctures and setae along each side, intervals convex and uniform. Microsculpture of the head and elytra almost isodiametric, much finer on the former than the latter; on the prothorax the meshes are very irregularly disposed and much wider than long. Underside sparsely punctate at sides, prosternal process unbordered, metepisterna a half longer than wide, not outwardly sulcate, profemora ♂ not dentate, tarsal joints slightly pubescent, joints 2 and 3 of the ♂ protarsi not much longer than wide.

Very much like *C. circumdatus* BRULLÉ, but much more shiny, the prothorax shorter, more finely punctate, and with small rounded basal foveae replacing the deep linear ones of *circumdatus*, the elytral striae much more evidently crenulate.

Residency Kediri: Ngoenoet, 4 ex. ♂ ♀.

Dischissus formaster sp. n.

Length: 14 - 15 mm.

Black, rather shiny: each elytron with two small, transverse lemon-coloured spots, sinuous in outline, the front one behind the shoulder, extending from stria

4 to the margin, and continued half way across the epipleuron, the colour running a little forward on the odd intervals and backward on the even ones, the hind one covering intervals 5 to 8, the patches of colour on 6 and 8 very small (in the cotype there is also a small patch on interval 4). Surface sparsely pubescent.

Head small, with deep wide furrows, converging behind, labrum emarginate and, like the clypeus, impunctate, neck with a few punctures, surface otherwise irregularly and fairly closely punctate, eyes large and hemispherical, antennae long and slender, palpi with the last joint securiform in both maxillaries and labials (♂). *Prothorax* rather flat, three-fifths wider than head, about a fifth wider than long, base with its sides oblique, wider than apex, sides strongly rounded, explanate, narrowly in front, more widely behind, slightly reflexed, hind angles projecting on each side as a small, obtuse, though fairly sharp tooth; median line slight, but visible, basal foveae fairly deep, surface coarsely and confluently punctate. *Elytra* convex, ovate, about a third wider than prothorax, a fourth longer than wide, widest behind middle, a faint emargination on each side before middle, and another close to apex; striae deep, finely punctate, 4 pushed a little inwards opposite the yellow, spots, surface finely but not very densely punctate. Microsculpture of the elytra isodiametric but rather faint; none on head and prothorax. Underside coarsely, the middle of venter more finely punctate, metepisterna a little longer than wide, front margins of ventral segments crenulate where exposed. Tarsal joints finely and sparsely pilose above, densely beneath.

Very nearly allied to *D. guttiferus* Schaum, though slightly larger, the prothorax with its surface less coarsely, but more densely and more confluently punctate, its sides more evidently explanate, but rather less reflexed, the elytra relatively longer, the intervals less convex and more evidently punctate, the yellow spots larger, extending inwards to stria 4.

West Java: Residency Buitenzorg, Djampang Tengah, G. Tjisoeroe, 6 - 800 m (M. E. Walsh), 2 ex. The type is in good condition, but the cotype has the head and prothorax damaged.

Peronomerus xanthopus sp. n.

Length: 7.5 mm.

Black, upper side with a vague bluish tinge; palpi, joints 1 to 3 of antennae, and legs flavous. Body with a fairly conspicuous pale, erect pubescence.

Head rather flat, with long deep frontal impressions, converging a little behind, bounded outwardly on each side by a rounded ridge, eyes large, hemispherical, antennae rather thick, reaching basal fourth of elytra, surface punctate, clypeus, middle of front, and neck smooth. *Prothorax* moderately convex, rather less than a half wider than head, as long as wide, base truncate, its sides a little oblique, evidently wider than apex, front angles practically adjoining neck, sides faintly rounded in front, obtusely angulate a little behind middle, sharply sinuate close to base, hind angles projecting laterally on each side as a fairly

sharp, acute tooth; median line faint, basal foveae short, linear, moderately deep, near the angles, surface coarsely, densely, and somewhat confluently punctate. *Elytra* convex, oval, with distinct though rounded shoulders, about a half wider than prothorax, a little more than a half longer than wide, a slight sinuation on each side before apex; striae deep and very clearly punctate, especially at sides, the striole long, intervals convex, finely and fairly closely punctate. No microsculpture. Underside rather coarsely punctate, metasternum almost impunctate, venter finely punctate; metepisterna not much longer than wide.

Very similar to *P. fumatus* SCHAUM, and hardly smaller, but the palpi, basal joints of antennae, and legs are flavous. Head with longer and deeper frontal furrows converging behind; prothorax similar, but with strongly projecting, acute hind angles; elytral intervals more finely punctate.

Residency Kediri: Pakel (C. J. LOUWERENS), 1 ex. Residency Banjoemas: (F. C. DRESCHER), 2 ex.

Oodes infimus sp. n.

Length: 5 - 5.4 mm.

Black: palpi, joints 1 to 3 of antennae, and tarsi ferruginous; tibiae and femora piceous. Upper surface microscopically punctate.

Head small, smooth, and practically without impressions, eyes moderately prominent, antennae slender, hardly extending beyond base of elytra. *Prothorax* convex, nearly twice as wide as head, nearly two-thirds as wide as long, widest at base and strongly contracted at apex, which is a little emarginate and bordered at sides, sides very finely bordered and gently rounded, hind angles slightly rounded, a little obtuse, without pore; median line slight, the other usual impressions obsolete, surface smooth. *Elytra* convex, oval, hardly wider than prothorax, about a half longer than wide, basal border extending inwards on each side as far as stria 2, a small tooth at each shoulder; striae fine and finely punctate, 1 and 2 arising on each side in a rather large umbilicate pore, the other striae not quite reaching base, striole rudimentary, intervals flat, 3 with a minute pore just behind middle, and another one towards apex, surface smooth. Microsculpture of the prothorax and elytra very irregular, formed by meshes much longer in one direction than the other; on the head the meshes are mainly isodiametric. Underside impunctate; pro- and metasternal processes both bordered, mesosternum deeply sulcate along median line, metepisterna a half longer than wide; apical ventral segment ♂ with one marginal seta, ♀ with two setae on each side.

About the same length as the Sumatran *O. pygmaeus* ANDR., but much narrower, the head larger, the antennae shorter, the prothorax narrower and with an evident median line, the elytra much longer and less convex, the striae punctate, the striole rudimentary.

Residency Kediri: Bojolangoe, 1 ex.; Bandoeng, 1 ex.; Djengglik, 3 ex.

Acupalpus nesophilus sp. n.

Length: 3.6 - 4 mm.

Ferruginous: front of head and prothorax (except margins) piceous, elytra with a large blue-black band, which leaves the basal fourth, the sutural interval, and a small area at apex ferruginous, palpi, joints 1 and 2 of the antennae, and legs flavous.

Head convex, smooth, frontal furrows short, oblique, and fairly deep, eyes moderately prominent, antennae reaching basal fourth of elytra. *Prothorax* subquadrate, a fourth wider than head and as much wider than long, base slightly arcuate, a little wider than apex, sides narrowly bordered, rounded in front, nearly straight behind, a seta at apical third, hind angles obtuse, not reflexed, and not much rounded; median line moderately deep on disk, transverse impressions obsolete, basal foveae moderately deep, near the angles, and, like the rest of the surface, impunctate. *Elytra* fairly convex, a third wider than prothorax, a half longer than wide, only slightly dilated behind, shoulders square, apex obliquely truncate; striae deep, impunctate, scutellary striole rather short, intervals convex, especially near apex, 3 with a pore at three-fifths from base, adjoining stria 2, marginal series widely interrupted, surface smooth. Microsculpture of the elytra formed by vague transverse lines; on the prothorax there are very wide meshes; on the head the meshes are isodiametric, but faint. Prosternum with some setae along front margin and at the apex of the process; venter with the last three segments punctate and pilose, apical segment with 1 seta on each side in the ♂, 2 setae in the ♀. Tarsi not outwardly sulcate; ♂ protarsi with four dilated joints, joint 4 bilobed.

Larger than *A. annamensis* BATES but similarly coloured, though a larger part of the upper surface is dark. The prothorax is less narrowed behind, so that the base is evidently wider than the apex and the hind angles are not reflexed; the elytral striae are deeper and the intervals more convex.

Residency Kediri: Toeloengagoeng, 1 ex.; Zuider Geb.: Popoh, 1 ex. (type); Bandoeng, 1 ex.; Pakel, 1 ex.; Bojolangoe, 1 ex. The last two examples are immature and the elytra show hardly any dark marking.

Acupalpus rhombotus sp. n.

Length: 3.8 mm.

Ferruginous: head and joints 3 to 11 of antennae piceous, prothorax red, elytra with a fairly large black band across middle, extending both forwards and backwards along the middle, not reaching base, but reaching apex along the sutural interval, a slight brown line on each side near apex, so that there is a large flavous apical spot on each side.

Head convex, smooth, frontal furrows small but deep, continued to eye on each side by an oblique line, eyes fairly prominent, antennae reaching basal fourth of elytra. *Prothorax* convex, subquadrate, very little wider than head, a third wider than long, base slightly arcuate, barely wider than apex, sides bordered, gently rounded in front and faintly sinuate behind, a seta at apical

fourth, hind angles slightly obtuse but fairly sharp, not reflexed; median line, transverse impressions, and basal foveae all moderately deep, the front impression rather vaguely punctate, basal area closely punctate at sides in the foveae, more sparsely in the middle. *Elytra* moderately convex, a fourth wider than prothorax, a little more than two-thirds longer than wide, sides parallel, shoulders square, apex obliquely truncate; striae deep, with only vague traces of crenulation, striole short, intervals convex, 3 with a pore at three-fifths from base, adjoining stria 2, surface smooth. No microsculpture on head or prothorax, and only traces of transverse lines on the elytra. Prosternum with some setae along front margin; venter more or less punctate and pubescent, apical segment with one marginal seta on each side in the ♂, 2 setae in the ♀. Tarsi not outwardly sulcate, joint 4 emarginate.

Very much like the Indian *A. horni* ANDR. in size and form, but quite otherwise coloured, the base of the prothorax rather closely punctate and without the deep sulciform foveae of the Indian species.

Residency Kediri: Bojolangoe, 1 ex.; Toeloengagoeng, 1 ex.

Burma: Tharrawaddy (G. Q. CORBETT), 1 ex.

The coloration described above is that of the type specimen (Toeloengagoeng). The other two examples are both immature and show only a vague dark cloud on the disk of the elytra, but the pale oblique spots at apex are quite clear in both specimens.

Chlaeminus kedirensis sp. n.

Length: 5.25 - 6 mm.

Underside and base of femora piceous; upper surface black with aeneous or bluish metallic reflections; palpi, joint 1 of antennae (and joints 2 and 3 more or less), legs, and a rather square, sometimes transverse, apical spot on each elytron, covering intervals 5 to 7 (sometimes also 8), together with the apical border of the elytra, ferruginous.

Head convex, very smooth, frontal foveae fairly deep, parallel for a short distance, then diverging strongly, eyes prominent, antennae thick, reaching basal third of elytra. *Prothorax* convex, cordate, two-fifths wider than head, only a little wider than long, base wider than apex, sides bisetose, bordered, strongly rounded, sinuate close to the hind angles, which project a little laterally on each side as a sharp rectangular tooth; median line fine, basal sulci short but deep, parallel, close to hind angles, joining marginal channel along base, the space between them with few but very distinct punctures, surface otherwise smooth. *Elytra* convex, subovate, rather more than a fourth wider than prothorax, three-fourths longer than wide, sides parallel, slightly sinuate before apex; striae deep, minutely crenulate, intervals convex, finely and not very closely punctate and pubescent. Microsculpture consisting of fine transverse lines, hardly forming meshes, coarser on the prothorax than on the elytra; on the head the meshes are isodiametric. Metasternum with a few punctures at sides; metepisterna impunctate, twice as long as wide.

Smaller than *C. biguttatus* MOTCH., the elytra much less closely punctate, the puncturation about as dense as, though much finer than, that of *C. biplagiatus* CHAUD.

Residency Kediri: Djengglik, 2 ex.; Bojolangoe, 2 ex.; Bandoeng, 2 ex.; Toeloengagoeng, 1 ex.

In the type (Djengglik) the tint is bluish, there are very few punctures between the prothoracic sulci, and the puncturation of the elytral intervals is faint; in other specimens, the puncturation in each case is somewhat denser, but I cannot distinguish more than one species.

Perigona rubida sp. n.

Length: 3 mm. Width: 1.2 mm.

Light brown, with a faint reddish tint, the head piceous.

Head convex, smooth, frontal foveae short but fairly deep, diverging behind, eyes moderately prominent, antennae moniliform, hardly extending beyond base of elytra. *Prothorax* convex, subquadrate, very little wider than head, a third wider than long, base arcuate, barely as wide as apex, which is emarginate, sides bisetose, very finely bordered, gently rounded, with a trace only of sinuation before base, hind angles obtuse, but neither rounded nor reflexed; median line faint, basal foveae just visible as small rounded pores, surface smooth. *Elytra* rather flat, suboval, but with evident shoulders, nearly a half wider than prothorax and as much longer than wide, subtruncate at apex, and with a re-entrant angle at suture; striae very shallow, vaguely crenulate, the six inner ones all visible, intervals flat, 3 with three evident pores, surface smooth, marginal channel pubescent, more evidently so near apex, in addition to bearing the normal pores and setae. Microsculpture of the prothorax and elytra formed by very fine faint transverse lines; on the head there are isodiametric meshes.

Very much like *P. nigriceps* DEJ., and coming next to it in my key to the Sumatran species of the genus (Tijd. Ent. LXXII 1929, p. 326). The colour is pale instead of piceous, the prothorax is relatively larger, the elytra are flatter, and the striae much more in evidence.

Residency Kediri: Toeloengagoeng, 3 ex.

Dicranoncus ganodes sp. n.

Length: 9 mm.

Brown: head, prothorax, apical half of femora, and apex of tarsal joints piceous, elytra dark purplish blue.

Head small, convex, frontal foveae short, but moderately deep, an impression on each side close to the eye, eyes moderately prominent, antennae slender, reaching basal third of elytra. *Prothorax* moderately convex, a third wider than head, nearly as long as wide, base a little wider than apex, all the angles rounded, sides unbordered, evenly rounded, somewhat reflexed, without lateral setae; median line rather fine, transverse impressions shallow, basal foveae large, round,

and fairly deep, surface smooth, with one or two small punctures along base. *Elytra* moderately convex, elongate oval, three-fifths wider than prothorax, quite two-thirds longer than wide, border obtusely angulate at shoulder, truncate at apex over a width of three intervals on each side, the sutural interval terminating in a short sharp spine; striae moderately impressed, finely crenulate, a little deeper at apex; intervals somewhat convex, 3 with three pores, a faint depression on each side towards apex on intervals 4 - 6. Microsculpture of the elytra consisting of oblique lines, forming very elongate meshes; none on head or on disk of prothorax. Apical ventral segment with a single seta on each side in the ♂, 2 in the ♀. Metatarsi bisulcate; joint 4 of the tarsi emarginate, joint 5 setulose beneath.

In form similar to *D. quadridens* MOTCH., but quite otherwise coloured. In *ganodes* the prothorax is less contracted in front, the elytra are relatively longer and narrower, the border forms a more evident angle at shoulder, the inner spine of the truncature is much shorter, the outer angle only slightly dentate.

W. Java: Residency Priangan: Goenoeng Papandajan (C. J. LOUWERENS), 3 ex. ♂ ♀; Garoet, Kamodjang, 1400 m (H. OVERBECK).

Orthogonius lieftincki sp. n.

Length: 13 mm. Width: 5 mm.

Black, moderately shiny: palpi, antennae, and tarsi piceous, femora flavous.

Head small, convex, clypeal suture short but distinct, with a puncture at each end, eyes large and hemispherical, antennae stout, reaching basal fourth of elytra, ligula bisetose, surface closely vermiculate, with one or two oblique striae on each side of vertex. *Prothorax* convex, a half wider than head, nearly twice as wide as long, base narrowly bordered, a little produced at middle, rather wider than apex, which is also bordered and truncate, all the angles rounded, sides unbordered, rounded, slightly reflexed in front, explanate behind; median line fine, transverse impressions rather shallow, basal foveae small, rounded, and fairly deep, surface finely vermiculate-striate, with one or two fine punctures near the foveae. *Elytra* quadrate, moderately convex, a fourth wider than prothorax, nearly three-fourths longer than wide, basal border rounding shoulder, but extending inwards only to the middle of interval 5, shoulders square, sides parallel, apex rather sharply rounded; striae moderately impressed, finely crenulate, 1 and 2 arising in an umbilicate pore, scutellary striole fairly long, intervals a little convex, 3 and 5 slightly wider and 7 slightly narrower than the other intervals, 1 narrower and more convex towards apex, 3 with three dorsal pores, surface finely and sparsely punctate, chiefly on the odd intervals. Microsculpture isodiametric, much more visible on the elytra than on the head and prothorax. Underside impunctate; prosternal process bordered; protibiae not produced externally at apex, mesotibiae not dilated, metatibiae with fine, sharp, spurs, tarsal joint 4 bilobed in the pro- and mesotarsi, claws pectinate.

Nearly allied to *O. insularis* CHAUD., but a little smaller, the surface of the head closely vermiculate, the prothorax less wide, its sides reflexed in front, elytra with the basal border largely wanting, the striae rather deeper, the intervals more convex, the surface a little more visibly punctate.

W. Java: Buitenzorg, 250 m (M. A. LIEFTINCK), 1 ex. ♂.

Mastax louwerensi sp. n.

Length: 3.5 - 4.5 mm.

Black: basal half of head, prothorax, and sterna red; basal joint of antennae and two basal joints of palpi more or less ferruginous; base of femora and of tarsal joints, middle of tibiae, and two spots on each elytron whitish. The basal spot on the elytra is in the form of a narrow curved band round the shoulder, which tends to disappear on the inner intervals; the hind spot is small and transverse, occupying on each side about two-fifths of the elytron. Body sparsely pubescent.

Head wide and moderately convex, frontal impressions fairly deep, eyes moderately prominent, surface closely and irregularly punctate, middle of front nearly smooth, antennae thick, nearly reaching middle of elytra. *Prothorax* convex, slightly narrower than head, as long as wide, base gently arcuate, a little narrower than apex, front angles inconspicuous, sides gently rounded in front, strongly sinuate at a fourth from base, hind angles sharp acute and projecting laterally; median line rather lightly impressed, surface finely and closely punctate, much more finely than head. *Elytra* subquadrate, moderately convex, twice as wide as prothorax, a fourth longer than wide, widest at a fourth from apex, which is truncate, with a wide re-entrant angle at middle; three slightly raised longitudinal costae on each side, the area between the inner costa and the suture divided rather vaguely into shallow pits, no visible striae, surface shagreened, the microsculpture abnormal and irregular, the longitudinal or slightly oblique lines forming meshes three or four times longer in one direction than the other.

Larger than *M. sumatrensis* ANDR. and otherwise coloured, the head closely and conspicuously punctate, the prothorax with a normal and only lightly impressed median line, the elytra with only a pale narrow band round the shoulders and a smaller spot at apex.

Residency Kediri: Gambiran, 3 ex.; Pakel, 1 ex.; Bandoeng, 2 ex.; Karangredjo, 1 ex.; Bojolangoe, 1 ex.; Djenglik, 1 ex.; Toeloengagoeng, 3 ex.

Mastax humilis sp. n.

Length: 3 - 3.75 mm.

Notably smaller than *M. louwerensi,* though similar in shape, but the head, prothorax, and sterna are black. The pale markings on the elytra are similarly placed, but usually much reduced, and sometimes disappearing in front; a minute pale spot is usually present on each elytron behind near the suture. The surface of the head and prothorax is rather coarsely and irregularly rugose-striate, an

occasional puncture being visible. The apex of the prothorax is nearly a third wider than base, the front angles are sharp and project forward, but the hind angles hardly project laterally; the median line is hardly impressed, but is represented by a moderately wide, longitudinal area, bounded on each side by a fine ridge, the two ridges converging behind and nearly meeting at base. Apart from the pattern, the elytra are similar, though the three dorsal costae are a little more evident, and the microsculpture is very much the same.

Residency Kediri: Bojolangoe, 1 ex.; Kras, 1 ex.; Toeloengagoeng, 15 ex.

ON A COLLECTION OF FISHES FROM THE ESTUARY AND THE LOWER AND MIDDLE COURSE OF THE RIVER KAPUAS (W. BORNEO).

By

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Preface. The large and extensive collection of fishes dealt with in this paper has been collected for the greater part by Mr. L. COOMANS DE RUITER, formerly at Pontianak, officer in the Civil Service of the Netherlands East Indies. Most specimens have been collected in the Fishmarket of the little town of Pontianak, and were caught in an affluent of the Kapuas, the so-called Kapuas Ketjil and on the coast near the mouth of that affluent. Others were collected in several places in the neighbourhood near the villages of Kubu Terentang and of Gunung Ambawang and in the Padang Tikar Bay. All these localities are connected by numerous watercourses with the river Kapuas and therefore have a fishfauna quite similar to that of the main-river. Some fishes have come from the small Penitiriver, which is no affluent of the Kapuas, but which in times not so very long ago, perhaps younger than the iceage belonged to the river-basin of the Kapuas also. The fish-fauna will show no differences therefore. An other collection, consisting of about 50 species, has been collected by Mr. Ir. G. A. DE MOL, agricultural expert, at Pontianak. These fishes, which were in an excellent condition too, were collected farther up the river in the middle course near Smitau. Some of them were caught in the great lakes situated near the river.

Many interesting species, thus far unknown to Borneo or to the Kapuas were found and this collection adds many new facts to the fauna of Borneo. It is very surprising to learn that so many species were not recorded in literature for these regions, though several collections have already been made by competent naturalists. For the marine and coastal species new finding-places are as a matter of fact not so very important and they will teach us only something new as to the range of distribution in some cases. New localities of freshwater specimens have much more importance from a zoögeographical standpoint. Though of course this collection from one river-basin only is not sufficient to suggest new conclusions about the interesting zoögeography of the Sunda-Islands, the new facts will give new data for future workers on this subject.

I followed the names given in WEBER and DE BEAUFORT, "Fishes of the Indo-Australian Archipelago" and other handbooks. Some flatfishes have been determined by J. R. NORMAN, the well-known ichthyologist of the British Museum

and the Gobiids by Dr. F. P. KOUMANS of the Leyden Museum and in these cases I quoted the names give by them. Furthermore some other species have been named by Prof. Dr. L. F. DE BEAUFORT.

LIST OF FISHES.

Fam. Notopteridae.

1. *Notopterus chitala* (H.B.).

1 spec., 25 cm. July 1930, Fishmarket Pontianak. Leg. C. DE R.; 3 spec., 16 - 30 cm. October 1932. Middle course Kapuas. Leg. DE MOL.

Finformulae and measurements according to those given in literature, only the length of the maxillary is not quite similar. In my specimens it reaches not beyond the scaleless portion of the head behind the eye. In BLEEKERS drawings of *N. lopis* and *hypselonotus* (which are mere synonyms for *N. chitala*) as well as in the drawing given by WEBER and DE BEAUFORT of *N. chitala*, the maxillary is much longer and reaches beyond the scaleless part. Thus in this respect my specimens agree more with *N. borneensis* BLKR., but the number of scalerows on the praeoperculum (20 - 24) shows quite clearly the affinity with *N. chitala*.

Native name: Belidah. A very common and valuable foodfish, highly esteemed by the natives. Freshwater.

Fam. Osteoglossidae.

2. *Scleropages formosus* (MÜLL. and SCHL.).

1 spec., 24 cm. Aug. 1930 Sungei Terentang. Leg. C. DE R.; 1 spec., 39 m. July 1932 Middle course of Kapuas. Leg. DE MOL.

Native name: Silok. Eaten by the natives. The specimen from Sungei Terentang has no ventral fins. According to the natives these fishes should be able to "shoot" their food in the same way as *Toxotes*.

Fam. Chirocentridae.

3. *Chirocentrus hypselosoma* BLKR.

1 spec., 26 cm. July 1930 Padang Tikarbar. Leg. C. DE R.

Easily distinguishable from *Ch. dorab* by the maxillary which reaches to over the praeoperculum. (See Treubia Vol. XII 1930).

Native name: Parang Parang. A rather common fish in the estuaries of Borneo and Sumatra. Big specimens esteemed as food especially by the Chinese.

Fam. Dussumieriidae.

4. *Dussumieria* spec.

1 spec., 11 cm. July 1930. Padang Tikarbay. Leg. C. DE R.

I can not yet give the speciesname of this specimen. WEBER and DE BEAUFORT mention two species, *D. acuta* and *D. hasseltii* as occurring in the Indo-Australian Archipelago. Yet, whenever I got some *Dussumieria* specimens, I always found that they belonged neither to *D. acuta* nor to *hasseltii*, though they always bore more resemblance to *D. hasseltii* than to *acuta*. Great variety between

different specimens exists. In this respect it is a remarkable fact that more recent the newer authors never mention *D. acuta* and *hasseltii* together in one publication and often they feel not quite sure to which species their fishes belong. It may be possible therefore that *D. acuta* and *hasseltii* belong to one, variable species or that these two species have to be split up into several others. I hope that within not too long a time after this publication I shall be able to settle this.

Dussumieria occurs everywhere along the coast in small quantities.

Fam. Dorosomatidae.

5. *Dorosoma chacunda* (H.B.).

1 spec., 12 cm. Juny 1930. Padang Tikarbay; 2 spec., 9 cm. Sept. 1930. Telok Pekadai; 2 spec., 12 cm. Aug. 1930 Sungei Terentang; 1 spec., 13 cm. Nov. 1930. Sungei Kakap. Leg. C. DE R.

Native name: Sĕlanget. Rather common in shallow waters along the coast. A detritus (mud) eater.

Fam. Stolephoridae.

6. *Setipinna melanochir* (BLKR.).

1 spec., 10 cm. 18-5-'30. Padang Tikarbay (Batu ampar); 2 spec., 9 and 11 cm. Sept. 1930. Telok Pekadai; 1 spec., 14 cm. June 1930. Fishmarket Pontianak; 3 spec., 14 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Specimens from the Kapuas do not quite agree with the description given by BLEEKER. The anal is not so long and the pectoral is shorter too, though the number of the rays is the same. There are 33 - 35 abdominal scutes instead of 30 and 9 - 11 of them are postventral instead of 7. Most specimens have black pectorals (hence the name), but there are a few that have the pectorals pale and hyaline, a fact already mentioned by BLEEKER. These specimens are pale and not yellow over the whole body. Whether these specimens are anything like albinos or have retained their youth colours I can not decide here as yet. See also *S. breviceps*. A common food fish in the lower course of the rivers. Highly esteemed by the natives.

7. *Setipinna breviceps* (CANTOR).

2 spec., 13 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Within this species we see the same phenomenon as in *S. melanochir*. One of the two specimens was pale and had a whitish colour, while the pigment on back and fins was very slight and the other specimen had the normal yellow colour with a normal development of the black pigment. I did find the two varieties in front of other rivers too i.c. the Rokan and the Siak in Sumatra. Especially the nose of the yellow specimens is black, while the nose of pale ones has none or very little pigment. Differences in measurements or in the number of finrays and linea lateralis do not exist.

Native name: Biang Biang. Common in the sea in front of rivers likes to run up into brackish water. Highly esteemed food fish, which is carefully selected out of the catches and is eaten either fresh or salted and dried.

8. *Setipinna taty* (C.V.).

1 spec., 9 cm 14 Sept. 1930. Peniti-river; 1 spec., 13 cm 14 Sept. 1930. Sungei Kakap; 4 spec., 14 - 15 cm. Nov. Dec. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Bulu ayam (Hen's feather). This species is not so much esteemed as a food fish. It is mostly salted and dried together with the whole catch. Very common in estuaries and ascending the river as far as the brackish water reaches. The lowest salinity in which it thrives is about 10 - 15‰.

9. *Lycothrissa crocodilus* (BLKR.).

4 spec., 23 - 26 cm. June-July 1930. Middle course of Kapuas. Leg. DE MOL.

Native name: Silawari. It is not eaten by the natives and only used as bait for hooks. Common in the river, sometimes descending into slightly brackish water (5 - 10‰).

10. *Thryssa kammalensis* (BLKR.).

1 spec., 9 cm. July 1930. Fishmarket Pontianak; 5 spec., 8 - 10 cm. 14 Sept. 1930. Peniti-river. Leg. C. DE R.

Native name: Bulu ayam. Lives in sea before rivermouths. Enters into a salinity of 15 à 20‰. Young specimens go much farther.

11. *Stolephorus commersonii* LAC.

1 spec., 11 cm 18-5-'30. Batu Ampar; 1 spec., 7 cm. Sept. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Bilis.

12. *Stolephorus tri* (BLKR.).

4 spec., 9 - 11 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Bilis.

13. *Coilia macrognathus* BLKR.

2 spec., 20 - 23 cm. Febr. 1930. Pontianak fishmarket; 1 spec., 24 cm. Nov. Dec. Padang Tikarbay Leg. C. DE R.

Native name: Ikan Gundjing. My specimens have more abdominal scutes, 52 - 55 instead of ± 40 as given by BLEEKER. Furthermore the anal has more finrays 80 - 85, instead of 62 - 73. Yet the low number by BLEEKER may be accidental, as according to my experience many specimens of *Coilia* have the end of the tail bitten of by other fishes. A new caudal fin arises from the wound, but the number of rays in the anal has consequently been reduced very much. Thus I possess a specimen with only 50 rays in the anal fin. I described in detail a specimen quite alike to the specimens mentioned above from the Kumai river in my paper "New or rare fishes of the Indo-Australian Archipelago II". Treubia Vol. XIV 1933.

14. *Coilia dussumierii* C.V.

1 spec., 13 cm. 14 Sept. 1930. Sungei Terentang. Leg. C. DE R.

Native name: Bulu ayam. Common in front of rivermouths.

15. *Coilia coomansi* HARDENBERG.

B.8; D.1 3-(14)15; A. ± 90; P.18; V.6-7; Ll. ± 60; L.tr.10.

Elongate and compressed. Abdominal profile rounded. Dorsal profile straight

from snout to dorsal and straight from dorsal to caudal, the two lines forming a very blunt angle below dorsal. Head about 5, height about 5 in length without caudal. Snout prominent, somewhat shorter than eye. Maxillary pointed, reaching to end of praeoperculum. Distance tip of snout — origin of dorsal twice in length of anal. Ventrals inserted just before origin of dorsal, somewhat shorter than postocular part of head. Pectorals with 10 free rays, reaching beyond origin of anal. Length of the remaining, unfree, rays about as long as eye and snout. 22 - 24 keeled, abdominal scutes, 9 - 10 of which are postventral. ± 33 gill-rakers, more than twice as long as branchial filaments. Yellowish with a golden hue. Back pigmented. Dorsal somewhat blackish, other fins hyaline.

8 spec., 13 cm. 14 Sept. 1930. Peniti-river; 1 spec., 12 cm. March 1930. Fish-market Pontianak; 1 spec., 13 cm. July 1930. Fishmarket Pontianak; 3 spec., 13 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

This *Coilia* has, thus far, been overlooked by other naturalists. I named this species in honour of Mr. COOMANS DE RUITER. It is living in fresh and brackish water. Native name: Ikan gondjeng. Described by me for the first time in Treubia XIV 1934.

16. *Coilia borneensis* BLKR.

2 spec., 12 - 13 cm. April 1930. Padang Tikarbay; 4 spec., 11 - 14 cm 24-10-'30. Peniti-river. Leg. C. DE R.

Thus far not known in W. Borneo.

Fam. Clupeidae.

17. **Corica bleekeri** nov. spec.

Many spec. 18 - 35 mm. July 1932. Middle course of Kapuas. Leg. DE MOL.

B. 6; D. 13 - 14; A. 14 - 16 + 2; P. 12; V. 8; L.l. 35 - 36; L.tr. 9.

Elongate, compressed. Ventral profile more convex than dorsal, which is almost straight. Height 4 in length without caudal, head 4 in length, about 5 with caudal. Eye about 3 in head, equal to snout and to postorbital part. A hardly conspicious ridge on each side of vertex. Maxillary reaches somewhat beyond frontmargin of eye, somewhat more than twice in head. Origin of dorsal about midway between frontmargin of eye and origin of caudal, somewhat more than twice in head. Origin of dorsal about midway between root of caudal and snout.

First anal about ⅔ of head, second anal remote from first. Pectorals about ¾ of head. Origin of ventrals below third or fourth ray of dorsal, somewhat shorter than snout and eye. 14 - 15 abdominal scutes, 5 of them being postventral. 35 - 36 (37) vertebrae. Silvery, fins hyaline. A black spot on occiput. Two very faint dotted lines on back behind dorsal. The specimens of 35 mm were quite mature!

Native name in the middle course of the river: Bilis majang. These small fishes are eaten in big quantities either dried or salted.

18. *Corica pseudopterus* BLKR.

3 spec., 40 - 45 mm. July 1930. Padang Tikarbay. Leg. C. DE R.

As a matter of fact in the original description of BLEEKER the number of dorsal rays is given as 12 - 13 and the same number is given by GÜNTHER in the Catalogue of the British Museum. In his Atlas Ichthyologique BLEEKER gives as the number of dorsal rays 3/12 - 3/13, which means that the number is 15 - 16 in total, a number found by all later authors (VAILLANT excepted) as well as by myself. BLEEKER had only two specimens of this species at his disposal from Pamangkat not so far away from Pontianak. The British Museum is in the possession of one of the type specimens and this has 15 or possibly 16 dorsal rays as Mr. NORMAN was so kind as to inform me. Evidently GÜNTHER was wrong when describing this species in the Catalogue. Only VAILLANT seems to have had specimens with 13 - 14 dorsal rays, which do belong perhaps to my species *bleekeri*.

The chief distinghuising characters between *C. pseudopterus* and *C. bleekeri* are given here below.

	C. bleekeri	*C. pseudopterus*
Vertebrae	35—36(37)	(37)38—39
D. rays	13—14	15—16
Abdominal scutes	14—15	17—18
Linea lateralis	35—36	37—39
Dorsal:	somewhat before ventrals.	somewhat behind ventrals.
Maturity at:	± 35 mm.	± 45 mm.

A detailed description of *C. pseudopterus* has been given by me in Treubia Vol. XIII 1931.

19. *Corica goniognathus* (BLKR.).

2 spec., 6 - 7 cm. July 1932. Middle course of Kapuas; 1 spec., 8½ cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

One specimen has only 14 dorsal rays, instead of 15 - 16 as given in literature.

Native name: Bilis tamban. The fishes are eaten in a dried or salted condition. The native population assumes that the Bilis majang are the young of the Bilis tamban.

20. *Clupeoides lile* (C.V.).

1 spec., 85 cm. Fishmarket Pontianak July 1930; 2 spec., 8 - 8.5 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Bilis.

21. *Clupeoides borneensis* BLKR.

2 spec., 5.5 cm 18-5-1930. Padang Tikarbay (Batu Ampar); 1 spec., 9 cm 29-10-30. Peniti-river. Leg. C. DE R.

My specimens differ in some points from the description made by BLEEKER from specimens from the Barito in South East Borneo. The dorsal fin is situated more to the forward and the maxillary reaches to the middle of the pupil

instead to below the frontmargin of the eye. In these respects my specimens agree with specimens from Sumatra, which however have less than 37 scales in the lateral line. (The specimens from Sumatra have been described by me in Treubia XIV, 1933).

Native name: Bilis. A riverspecies descending into brackish water.

22. *Clupea toli* C.V.

1 spec., 27 cm. July 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Tĕrubuk. The roe of this species, and of *Clupea macrura* also, is highly esteemed by the natives. It forms an important article of trade. A common fish in front of rivermouths. The fry ascends into brackish water. *Clupea macrura* is not represented in the collection; but will be found probably in these regions too.

23. *Clupea perforata* (CANT.).

1 spec., 15 cm. July 1930. Padang Tikarbay; 2 spec., 10 and 14 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Tembang. Not common in front of estuaries. This species does not ascend into brackish water.

24. *Pellona kampeni* WEBER and DE BEAUFORT.

3 spec., 12 - 14 cm. 18-5-'30. Padang Tikarbay (Batu Ampar); 1 spec., 10 cm. July 1930. Sungei Terentang; 8 spec., 9 - 17 cm. Aug. 1930. Sungei Terentang; 1 spec., 11 cm. Sept. 1930. Telok Pekadai; 1 spec., 16 cm. Nov. 1930. Telok Pekadai; 1 spec., 10.5 cm. Nov. 1930. Telok Pekadai; 1 spec., 17 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Puput. I have described some specimens from the Kumairiver (South Borneo) in detail in Treubia. One specimen from the Padang Tikarbay, Nov. 1930, had 39 dorsal rays instead of 43. It is a curious fact, that this species, which is so common in front of Borneo-rivers, is so seldom caught in front of Sumatra rivers. I posses only one single specimen from Sumatra (mouth of the Panei)! The reason of this we can only guess at the moment.

25. *Pellona amblyuropterus* BLKR.

1 spec., 8.5 cm. Sept. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Puput. Common in front of rivermouths, sometimes ascending into brackish water.

26. *Pellona dussumieri* C.V.

1 spec., 21 cm. June 1930. Padang Tikarbay; 1 spec., 9.5 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.

Native name: Puput. Rather common in front of rivermouths, sometimes ascending into brackish water. The largest specimen has the normal total number of abdominal scutes, but only 7 of them are postventral instead of 10.

27. *Pellona xanthoptera* BLKR.

1 spec., 8.5 cm. Sept. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Puput. Rare.

28. *Opisthopterus tartoor* (C.V.).

1 spec., 16 cm 14 Sept. 1930. Telok Pekadai. Leg. C. DE R.

Fam. Harpadontidae.

29. *Harpadon nehereus* (HAM. BUCH.).

1 spec., 20 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Fam. Clariidae.

30. *Clarias melanoderma* BLKR.

1 spec., 28 cm. Sept. 1930. Fishmarket Pontianak. Leg. C. DE R.; 2 spec., 30 and 36 cm. July 1930. Middle course of Kapuas. Leg. DE MOL.

Native name: Kěli. A foodfish highly esteemed especially by the Chinese. According to Mr. DE MOL this species is not very common.

Fam. Siluridae.

31. *Belodontichthys dinema* (BLKR.).

3 spec., 36, 40 and 42 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Lais tabirin. Common, eaten by the natives.

32. *Silurodes hypophthalmus* (BLKR.).

3 spec., 23, 26 and 28 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Lais pendek mulut (pendek mulut = short snout). A very common and highly appreciated food fish.

33. *Silurodes eugeniatus* (VAILL.).

4 spec., 14 - 17 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Lais nipah. A common fish. Often consumed in dried condition.

34. **Callichrous weberi** nov. spec.

B. 13; D. 4; A. 47; P. 1.9; V. 6.

Height 4.6, head 5.0 in length without caudal. Eye covered by skin, 4 in head. Pupil situated in the horizontal line through corner of mouth. Eye about 1.3 in snout. Jaws equal. Upper profile slightly rounded with a slight concavity at the nape. Highest point of back somewhat behind dorsal. Maxillary barbels reaching to 22th ray of anal. Mandibulary barbels very short, situated before eyes. Height of dorsal shorter than diameter of eye, situated just before origin of anal, its distance from the snout about 2½ in its distance from the caudal. Anal connected with caudal, its greatest height somewhat shorter than eye and snout. Caudal with rounded lobes. Ventrals a little before dorsal. Pectorals rounded with a smooth spine, somewhat shorter than head. Vomerine patches of teeth small, situated quite near together. Bands of fine teeth in jaws. 10 gillrakers. Colour of formaline-specimen brownish, lighter below. A blackish spot behind gillopening.

One specimen 79 mm. Padang Tikarbay, 18-5-1930. Leg. C. DE R. Named after Prof. Dr. MAX WEBER, the well known ichthyologist.

35. *Hemisilurus moolenburghi* WEBER and DE BEAUFORT.

1 spec., 30 cm. Dec. 1930. Fishmarket Pontianak. Leg. C. DE R.

My specimen differs in some minor points from the original description given by WEBER and DE BEAUFORT. The eyes are much smaller, going 10 times

in head, 5 times in interorbital space and 3 - 4 times in snout. Thus far unknown from Borneo. This specimen is described in detail in Treubia 15 1935.

36. *Cryptopterus lais* (BLKR.).

1 spec., 6 cm. March 1930. Fishmarket Pontianak; 1 spec., 13 cm. July 1930. Fishmarket Pontianak; 1 spec., 7 cm. July 1930. Padang Tikarbay; 1 spec., 10 cm. July 1930. Sungei Terentang. Leg. C. DE R.

Native name: Lais. It is only with some hesitation that I have given these specimen the name of *Cr. lais*. When we compare BLEEKER's descriptions of *Cr. bicirrhis* and *Cr. lais* we see that the first has the shorter barbels of the two, that the concavity of the neck and the convexity of the back are much less and that *Cr. bicirrhis* has a black blotch behind the operculum, which is lacking in *Cr. lais*. Furthermore *Cr. lais* has an incision in the band of maxillary teeth at the symphysis, which is not the case with *Cr. bicirrhis*. All my specimens have the dorsal profile of *Cr. bicirrhis* and they also have the black blotch. In these respects therefore they resemble this species. Yet they have the long barbels of *Cr. lais* and also the incision in the band of maxillary teeth. My specimens are therefore intermediate between the two species, which gives strength to the supposition of WEBER and DE BEAUFORT, that *Cr. bicirrhis* and *lais* have to be combined.

37. *Cryptopterus cryptopterus* (BLKR.).

1 spec., 10 cm. 18-5-1930. Padang Tikarbay; 1 spec., 15 cm. June 1930. Fishmarket Pontianak; 1 spec., 13 cm. 29-10-1930. Penitiriver. Leg. C. DE R.

38. *Cryptopterus limpok* (BLKR.).

1 spec., 22 cm. Dec. 1930. Fishmarket Pontianak; 3 spec., 22 - 25. July 1932. Middle course of Kapuas. Leg. C. DE R.

Native name: Lais kĕrak.

39. *Cryptopterus micronema* (BLKR.).

1 spec., 15 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.; 2 spec., 27 - 29 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Lais djoengang. Seems to descend into brackish water.

40. *Cryptopterus hexapterus* (BLKR.).

1 spec., 8 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.

This species is fairly common in brackish water.

Fam. Plotosidae.

41. *Paraplotosus albilabris* (C.V.).

1 spec., 12 cm. July 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Sembilang. Not found in Borneo before.

Fam. Pangasidae.

42. *Pseudeutropius brachypopterus* (BLKR.).

2 spec., 11 cm. July 1932. Middle course of Kapuas; 1 spec., 12 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Nuajang. My specimens have 32 instead of 28 anal rays. The anal fin is consequently somewhat longer and goes only 3 in body. Two

peculiar conical organs project into the mouth cavity from the dorsal wall of the pharynx. Their surface is finely striated. May be they are some auxiliary organs for respiration.

43. *Pangasius nasutus* (BLKR.).
1 spec., 28 cm. July 1932. Fishmarket Pontianak. Leg. C. DE R.
Native name: Patin. Sometimes found in brackish water.

44. *Pangasius polyuranodon* BLKR.
1 spec., 15 cm. July 1930. Sungei Kakap. Leg. C. DE R.
Native name: Patin. Sometimes descending into brackish water.

Fam. Ariidae.

45. *Arius maculatus* (THUNB.).
1 spec., 13 cm. July 1930. Sungei Kakap. Leg. C. DE R.
A common species in estuaries.

Fam. Bagridae.

46. *Macrones baramensis* REG.
1 spec., 9.5 cm. 18-5-1930. Padang Tikarbay (Batu Ampar). Leg. C. DE R.
This species seems to be very rare. In literature it is only mentioned for the Baram river. I possess also a specimen from the estuary of the Rokan (Sumatra). My specimens show some very slight differences with the description given by REGAN. The height goes 4½ in length, the head 3½ times, REGAN's figures being 4⅔ and 3⅔ respectively. The breadth of the head goes 1⅔ in its length instead of 1⅓. Otherwise my specimen agrees quite well with the original. The differences are so small, that they are probably due to individual variation.

47. *Macrones wolfii* (BLKR.).
2 spec., 15 - 16 cm. August 1930. Sungei Terentang. Leg. C. DE R.
Descends into brackish water.

48. *Macrones nemurus* (C.V.).
4 spec., 25 - 30 cm. July 1930. Middle course of Kapuas. Leg. DE MOL.
Native name: Patik. The head shields of my specimens are not rugose, but smooth.

49. *Macrones gulio* (HAM. BUCH.).
1 spec., 10 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.

49a. *Macrones nigriceps* (C.V.).
2 spec., 18 - 22 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.
Native name: Landin.

50. *Bagroides melapterus* BLKR.
1 spec., 21 cm. Dec. 1930. Fishmarket Pontianak. Leg. C. DE R.

Fam. Cobitidae.

51. *Botia hymenophysa* (BLKR.).
3 spec., 13 - 14 cm. Nov. 1930. Middle course of Kapuas. Leg. DE MOL.
Native name: Ulang uli. Seems to be rather rare.

Fam. Cyprinidae.

52. *Chela oxygastroides* (BLKR.).

3 spec., 17 - 19 cm. Nov. 1930. Middle course of Kapuas. Leg. DE MOL.

Native name: Kelampok. A common species, used as bait for hooks.

53. *Macrochirichthys macrochirus* (C.V.).

1 spec., 12 cm. 18-5-1930. Padang Tikarbay (Batu Ampar); 1 spec., 20 cm. July 1930. Padang Tikarbay; 1 spec., 10 cm. Nov.-Dec. 1930. Padang Tikarbay. Leg. C. DE R.; 3 spec., 35 - 36 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Belantan or Parang Parang ulu. A common species, which seems to descend into brackish water. The figures given in handbooks are not quite correct, as they are drawn after dead specimens. When alive the head is just in the length of the body, when dead the head is bent backwards.

54. *Rasborichthys helfrichi* (BLKR.).

3 spec., 12 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Seluang buluh. A common species.

55. *Rasbora argyrotaenia* (BLKR.).

6 spec., 8 - 13 cm. 18-5-1930. Padang Tikarbay; 2 spec., 12 cm. July 1930. Sungei Terentang. Leg. C. DE R.; 3 spec., 8 - 9 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Seluang budjur. Common. Used as bait. Seems to descend into brackish water.

56. *Rasbora kalochroma* (BLKR.).

4 spec., 6 - 7 cm. 18-5-1930. Pungur Besar; 3 spec., 7 - 8 cm. Sept. 1930. Gunung Ambawang; 3 spec., 6 - 7 cm. Nov. 1930. Gunung Ambawang. Leg. C. DE R.

57. *Rasbora einthoveni* (BLKR.).

6 spec., 5 - 6 cm. March 1930. Fishmarket Pontianak; 3 spec., 3 - 4 cm. March 1930. Gunung Ambawang; 10 spec., 4 - 7 cm. Sept. 1930. Gunung Ambawang. Leg. C. DE R.

58. *Rasbora cephalotaenia* (BLKR.).

2 spec., 8 and 11 cm. Sept. 1930. Gunung Ambawang. Leg. C. DE R.

59. *Luciosoma trinema* (BLKR.).

1 spec., 10 cm. 18-5-1930. Padang Tikarbay; 1 spec., 12 cm. July 1930. Padang Tikarbay. Leg. C. DE R.; 3 spec., 15 - 17 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kenjuar. Seems to descend into brackish water.

Not common!

60. *Leptobarbus hoevenii* (BLKR.).

2 spec., 9 and 12 cm. March 1930. Fishmarket Pontianak; 3 spec., 8 - 11 cm. August 1930. Sungei Terentang. Leg. C. DE R.; 1 spec., 19 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Bundung. A common species.

61. *Leptobarbus melanopterus* WEBER and DE BEAUFORT.

3 spec., 27 - 32 and 28 cm. July 1932. Middle course of Kapuas; 2 spec., 21 - 25 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Bundung or Piam. This specimen has 5½ scales above the lateral line before the dorsal fin. According to the description they should have 15 scales around the caudal peduncle, yet they have only 14, as is the case in *L. hoevenii*.

The coloration of the fins is the same as given by WEBER and DE BEAUFORT. Not very common.

62. *Roteichthys microlepis* (BLKR.).

4 spec., 18 - 22 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kapas. A common species.

63. *Amblyrhynchichthys truncatus* (BLKR.).

1 spec., 8 cm. 18-5-1930. Padang Tikarbay; 3 spec., 8, 9 and 14 cm. July 1930. Sungei Terentang; 3 spec., 7 - 10 cm. Sept. 1930. Sungei Terentang; 1 spec., 11 cm 5-11-1930. Penitiriver. Leg. C. DE R.

Seems to descend into slightly brackish water.

64. *Dangila ocellata* (HECK).

3 spec., 6 - 7 cm. March 1930. Fishmarket Pontianak; 1 spec., 11 cm. July 1930. Sungei Kakap. Leg. C. DE R.; 3 spec., 11 - 12 cm. July and Nov. 1930. Middle course of Kapuas. Leg. DE MOL.

Native name: Ban Tadung. Some specimens have the foremost black blotch partly above the lateral line.

65. *Dangila fasciata* BLKR.

1 spec., 7 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.

My specimen has a black blotch, not mentioned in literature, just below the lateral line, above the pectorals. This may be due to the youth of the individual. WEBER and DE BEAUFORT state that the anal fin commences below the 25th scales of the lateral line. This is probably a misprint for 35. Seems to descend into brackish water.

66. *Dangila kühli* C.V.

2 spec., 8 - 10 cm. June 1930. Padang Tikarbay; 3 spec., 10 cm. July 1930. Sungei Terentang; 1 spec., 10 cm. Aug. 1930. Sungei Terentang. Leg. C. DE R.

Seems to descend into brackish water. Until now only known from Sumatra.

67. *Dangila festiva* (HECK).

1 spec., 7 cm. March 1930. Fishmarket Pontianak. Leg. C. DE R.; 3 spec., 14 - 23 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kudjan. Common.

68. *Barynotus microlepis* (BLKR.).

1 spec., 9 cm. March 1930. Fishmarket Pontianak; 1 spec., 8 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.; 3 spec., 19 - 21 cm. July 1932. Middle course of Kapuas; 1 spec., 30 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Paku. Seems to descend into brackish water.

69. *Thynnichthys thynnoides* (BLKR.).

3 spec., 24 - 28 cm. July-Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Mentukan. Common.

70. *Thynnichthys polylepis* BLKR.

1 spec., 6 cm. March 1930. Fishmarket Pontianak. Leg. C. DE R.; 3 spec., 21 - 23 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Bau Ketup. Rather common.

71. *Osteochilus melanopleura* (BLKR.).

2 spec., 12 cm. July 1930. Sungei Terentang. Leg. C. DE R.; 3 spec., 19 - 23 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Two specimens called by the natives Kelabau had a melanistic appearance. The third called, Kelabau padi, had a normal colour.

72. *Osteochilus schlegeli* (BLKR.).

1 spec., 6 cm. March 1930. Fishmarket Pontianak; 1 spec., 6 cm. 18-5-1930. Padang Tikarbay; 1 spec., 8 cm. July 1930. Padang Tikarbay; 1 spec., 8 cm. July 1930. Sungei Terentang. Leg. C. DE R.; 3 spec., 25 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kenali. Seems to descend into brackish water.

73. *Osteochilus vittatus* (C.V.) (BLKR.).

1 spec., 5 cm. March 1930. Fishmarket Pontianak; 1 spec., 4 cm 18-5-1930. Padang Tikarbay; 1 spec., 15 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.; 1 spec., 13 cm. July 1932. Middle course of Kapuas; 2 spec., 11 - 12 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Bantak. Seems to descend into brackish water. Common.

74. *Osteochilus triporus* (BLKR.).

3 spec., 16 - 17 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

L.tr. 5½-1-5½. 3½ series of scales between lateral line and dorsal. A black spot anteriorly on the base of dorsal. The black longitudinal band, which may be absent in *O. vittatus* also, is missing. There are dark spots on the scales. These specimens seem to be really different from the species of *O. vittatus* mentioned above. See also WEBER and DE BEAUFORT Part III, page 133.

Native name: Menjadin. A common species, frequently eaten by the natives.

74a. *Osteochilus intermedius* WEBER and DE BEAUFORT.

1 spec., 11 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

L.tr. 4½-1-6½. A black spot anteriorly on the base of dorsal. No longitudinal band, but rows of black spots along the rows of scales. The bands on the outer upper and lower margin of the caudal are entirely absent in my specimens. Is *O. intermedius* only a variety of *O. triporus* and not a real species as is suggested by WEBER and DE BEAUFORT on page 132 Part III? One would be inclined to say so. The l.tr. is now 4½-1-6½ and not 5½-1-5½ as in *O. triporus*. The linea lateralis has shifted one scale upwards! The difference between *O. triporus* and *intermedius* is becoming very small, now that it is

known that the black bands on the caudal, which were the only other features for distinguishing the two species, may be absent also.

Native name; Palau? A rare species.

75. *Osteochilus brevicauda* WEBER and DE BEAUFORT.

2 spec., 19 - 22 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Palau. Probably the name Palau given by DE MOL for *O. intermedius* is a mistake. The habitus of *O. intermedius* and *O. brevicauda* is quite different, but the habitus of *O. intermedius* is quite the same as that of *O. triporus* which is called menjadin. It is not probable that the natives will distinguish these two species from each other.

76. *Hampala macrolepidota* (C.V.).

1 spec., 38 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Langkung. Rare. A predatory fish.

77. *Cyclocheilichthys apogon* C.V.

3 spec., 6 - 7 cm. March 1930. Fishmarket Pontianak. Leg. C. DE R. 5 spec., 13 - 16 cm. July 1933. Middle course of Kapuas. Leg. DE MOL.

Native name: Buin or Kempĕras.

78. *Cyclocheilichthys repasson* (BLKR.).

2 spec., 14 - 17 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

My specimens have for the linea transversalis 7-1-6½ and 7-1-5½ instead of 7-1-7. The caudal peduncle is surrounded by 16 scales instead of 20. In these respects the animals agree with the description of *C. lineatus*. Yet I do not hesitate to call them *C. repasson* as in all other features, especially in coloration they agree so closely with the description of this species.

79. *Puntius schwanefeldi* (BLKR.).

1 spec., 9 cm. March 1930. Fishmarket Pontianak; 1 spec., 5 cm. 18-5-1930. Padang Tikarbay; 1 spec., 14 cm. July 1930. Sungei Terentang. Leg. C. DE R.; 3 spec., 20 - 24 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Suain or Djĕlawat. My specimens have 18 - 20 scales around the caudal peduncle instead of 16, as given in literature.

80. *Puntius lateristriga* (C.V.).

3 spec., 9 - 10 cm. April 1930. Gunung Ambawang rivulets; 3 spec., 7 - 11 cm. Sept. 1930. Gunung Ambawang rivulets; 6 spec., 7 - 14 cm. Nov. 1930. Gunung Ambawang rivulets. Leg. C. DE R.

Furthermore I got specimens from the Karimata Islands in the South Chinese Sea. (18-3-1930).

81. *Puntius everetti* (BLGR.).

3 spec., 7 - 9 cm. March 1930. Fishmarket Pontianak; 10 spec., 2 - 8 cm. 13-3-1930. Rivulets of the Gunung Ambawang. Leg. C. DE R.

82. *Puntius hexazona* WEBER and DE BEAUFORT.

1 spec., 3 cm. 13-3-1930. Rivulets of the Gunung Ambawang; 1 spec., 47 cm. Sept. 1930. Rivulets of the Gunung Ambawang; 1 spec., 3 cm. Date? Sungei Terentang. Leg. C. DE R.

D. 4.8; A. 3.5; P. 1.13; V. 1.8; L. 1.24; L.tr. 5½-1-4½.

Oblong. Dorsal profile strongly arched with a slight concavity above the nape. Height 2.7 in length, 3.5 in length with caudal. Head 3.2, 4.2 in length with caudal. Eye 3.7 in head, somewhat longer than snout. Barbels longer than eye. Origin of dorsal opposite to 8th scale of lateral line, somewhat behind origin of ventrals separated by 9 scales from occiput. Fourth osseous spine of dorsal rather strong, serrated somewhat longer than head without snout. Anal somewhat shorter than head without snout. Ventrals and pectorals subequal. Caudal deeply emarginated, the lobes somewhat pointed. Caudal peduncle surrounded by 12 scales. Colour (in formol) dark red, lighter below.

Six transverse light margined bands. The first through the eyes, bent backwards and uniting on the nape. The second behind the operculum and the pectorals. The third from the dorsal spine to behind the ventrals. The fourth behind the dorsal to the beginning of the anal. The fifth on caudal peduncle and the sixth at the base of the caudal.

The above description, which fits in fairly well with the original description of the species by Weber and de Beaufort, is made after the specimen of 47 mm (total length) from the rivulets of the Gunung Ambawang. Sept. 1930. This species was hitherto only known in Sumatra.

83. *Puntius fasciatus* (Blkr.).

2 spec., 8 - 11 cm. Sept. 1930. Rivulets of the Gunung Ambawang. Leg. C. de R.; 1 spec., 9 cm. Nov. 1933. Middle course of Kapuas. Leg. de Mol.

Native name: Mengharit. My specimens have only 1 à 2 longitudinal bands above the lateral line. Other differences from the original description were not found.

84. *Puntius anchisporus* (Vaill.).

3 spec., 6 - 7 cm. Nov. 1932. Middle course of Kapuas. Leg. de Mol.

Native name: Berbadju. Common, used as bait for hooks.

85. *Puntius waandersi* (Blkr.).

1 spec., 19 - 20 cm. July 1932. Middle course of Kapuas. Leg. de Mol.

Native name: Umpan Umpan. Common.

86. *Puntius bulu* (Blkr.).

1 spec., 9 cm. July 1930. Sungei Terentang; 1 spec., 6 cm. Aug. 1930. Sungei Terentang. Leg. C. de R.

87. *Balantiocheilus melanopterus* (Blkr.).

2 spec., 9 - 10 cm. July 1930. Sungei Terentang; 1 spec., 11 cm. July 1930. Fishmarket Pontianak; 2 spec., 7 - 8 cm. Aug. 1930. Sungei Terentang. Leg. C. de R.; 4 spec., 19 - 24 cm. July 1932. Middle course of Kapuas. Leg. de Mol.

Native name: Tutung. Very common.

88. *Barbichthys laevis* (C.V.).

1 spec., 6 cm. March 1930. Fishmarket Pontianak. Leg. C. de R.

89. *Paracrossochilus vittatus* (Blkr.).

8 spec., 3 - 5½ cm. Dec. 1930. Singkawang. Leg. C. de R.

90. *Epalzeorhynchus kallopterus* (BLKR.).
2 spec., 12 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.
Native name: Seluang batu or Ikan batu. Very rare.

Fam. Synbranchidae.

91. *Synbranchus bengalensis* (MC. CLELL.).
1 spec., 20 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.
Native name: Belut. Not common. Rarely eaten by the natives.

Fam. Syngathidae.

92. *Microphis boaja* (BLKR.).
1 spec., 276 mm. July 1930. Padang Tikarbay. Leg. C. DE R.

Fam. Belonidae.

93. *Tylosurus strongylurus* (v. HASS.).
1 spec., 37 cm. July 1930. Padang Tikarbay. Leg. C. DE R.
This Tylosurus species is characteristic for rivermouths.

94. *Xenentodon canciloides* (BLKR.).
1 spec., 13 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.
Native name: Kanjulung. Not common. The position of the dorsal fin seems to be variable. BLEEKER said in his first description (Nat. Tijdschr. Ned. Indië V 1853, p. 64) that the origin of the dorsal is opposite to the third or fourth ray of the anal. Later on he corrected this and stated that the origin of the dorsal was opposite to the origin of the anal. WEBER and DE BEAUFORT in their fishes of the Indo-Australian Archipelago Vol. IV p. 133, confirm this fact. Yet my specimen has the origin of the dorsal opposite to the third anal ray.

Fam. Hemirhamphidae.

95. *Dermogenys orientalis* (M. WEB.).
2 spec., 4½ cm. March 1930. Fishmarket Pontianak; 1 spec., 4½ cm. Aug. 1930. Sungei Terentang. Leg. C. DE R.
My specimens have a larger head than given in the original description of WEBER. WEBER and DE BEAUFORT already mention this fact (Fishes of the Indo-Australian Archipelago Vol. IV p. 137).

96. *Hemirhamphus unifasciatus* RANZ.
1 spec., 15 cm. 18-5-1930. Padang Tikarbay (Batu Ampar); 1 spec., 10 - 11 cm. July 1930. Fishmarket Pontianak; 1 spec., 13 cm. 14-9-1930. Sungei Kakap; 1 spec., 17 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.
Native name: Djulung Djulung.

97. *Hemirhamphus marginatus* (FORSK.).
1 spec., 29 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.

98. *Zenarchopterus buffoni* C.V.
1 spec., Telok Pekadai. Nov. 1930. Leg. C. DE R.
Native name: Sedjulung or Djulung Djulung.

99. *Zenarchopterus pappenheimi* E. MOHR.

2 spec., 18 cm. Telok Pekadai. Nov. 1930. Leg. C. DE R.

D. 12; A. 11; P. 10; V. 6; L. l. ± 42.

Height 7 in length from tip of upper jaw to base of caudal. Head from tip of upper jaw to branchial opening 3.6 in length. Lower jaw (reckoned from tip of upper jaw to the end) about 1 in head. Upper jaw about as long as broad. Origin of dorsal somewhat in advance of anal papil. Origin of anal below fourth or fifth dorsal ray. Dorsal rays not altered. The first five rays of the anal are more or less normal in shape. The sixth is very broad and abnormal. The 7th and 8th are as long as the 6th. They have the same shape though they are not so broad. The 9th and 10th anal ray are placed within a callosity of the skin. Colours not obvious in my preserved specimens.

Fräulein E. MOHR from the Zoölogical Museum at Hamburg was so kind as to specify these animals for me. As far as I know from literature, found for the first time in the Indo-Australian Archipelago.

Fam. Polynemidae.

100. *Eleutheronema tridactylum* (BLKR.).

1 spec., 20 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

I have described individuals of this species from South Borneo and Sumatra elsewhere in detail (Treubia XIII). The specimen from the Telok Pekadai shows no differences from that description.

101. *Eleutheronema tetradactylum* (SHAW.).

1 spec., 14 cm. July 1930. Fishmarket Pontianak; 3 spec., 14 - 16 cm. Aug. 1930. Sungei Terentang; 3 spec., 12 - 14 cm. 14-9-1930. Peniti-river; 2 spec., 17 - 19 cm. Sept. 1930. Telok Pekadai; 1 spec., 19 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Senangin or Kuro. Young specimens like those mentioned above are characteristic for the fauna of rivermouths.

102. *Polynemus indicus* SHAW.

1 spec., 20 cm. July 1930. Padang Tikarbay; 1 spec., 23 cm. Aug. 1930. Sungei Terentang. Leg. C. DE R.

My specimens have most pectoral rays simple instead of divided as given by WEBER and DE BEAUFORT (See their Fishes of the Indo Australian Archipelago Vol. IV page 206) and by other authors.

103. *Polynemus sextarius* BL. SCHN.

1 spec., 10 cm. 14-9-1930. Sungei Kakap. Leg. C. DE R.

I described this specimen in detail in Treubia Vol. XIII 1931 p. 414.

104. *Polynemus heptadactylus* C.V.

9 spec., 13 - 15 cm. 27-5-1930. Padang Tikarbay; 1 spec., 12 cm. July 1930. Fishmarket Pontianak; 2 spec., 12 - 13 cm. Sept. 1930. Sungei Kakap; 3 spec., 12 - 14 cm. Oct. 1930. Pontianak. Leg. C. DE R.

Native name: Kuro or Senangin. Common.

105. *Polynemus borneensis* BLKR.

1 spec., 19 cm. July 1930. Fishmarket Pontianak; 1 spec., 20 cm. Aug. 1930. Sungei Terentang; 3 spec., 9 - 13 cm. Peniti-river; 1 spec., 18 cm. 14-9-1930. Sungei Kakap; 4 spec., 11 - 16 cm. Nov. 1930. Telok Pekadai; 1 spec., 9 cm. 29-10-1930. Mouth Peniti-river. Leg. C. DE R.

Native name: Kuro or Senangin. The linea lateralis counts about 75 instead of about 65 as given in literature.

106. *Polynemus macrophthalmus* BLKR.

1 spec., 52 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kuro or Senangin. Common. Esteemed as food fish.

107. *Polynemus multifilis* SCHN.

1 spec., 23 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kuro or Senangin.

Fam. Sphyraenidae.

108. *Sphyraena jello* C.V.

1 spec., 17 cm. Nov. 1930. Sungei Kakap. Leg. C. DE R.

Fam. Mugilidae.

109. *Mugil dussumieri* C.V.

1 spec., 10 cm. 18-5-1930. Padang Tikarbay; 1 spec., 15 cm. July 1930. Sungei Kakap; 2 spec., 21 cm. Dec. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Bělanak.

110. *Mugil oligolepis* BLKR.

5 spec., 5 - 7 cm. 18-5-1930. Padang Tikarbay (Batu Ampar); Many spec., 7 - 12 cm. Aug. 1930. Sungei Terentang; 1 spec., 9 cm. 14 Sept. 1930. Peniti-river; 3 spec., 10 - 12 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Bělanak. It is with some doubt that I give my specimens the name of *M. oligolepis* as the height of the body is longer than the head instead of shorter and the maxillary is not visible when the mouth is closed. I shall deal with this question in a future publication.

111. *Mugil troscheli* BLKR.

2 spec., 9 - 13 cm. Aug. 1930. Sungei Terentang. Leg. C. DE R.

Native name: Bělanak. The origin of the dorsal is placed in the middle between end of snout and base of caudal.

112. *Mugil cephalus* L.

1 spec., 9 cm. July 1930. Sungei Kakap; 1 spec., 8 cm. 14-9-1930. Sungei Kakap. Leg. C. DE R.

Native name: Bělanak. Besides the specimens mentioned above I got one specimen from the Karimata Islands (March 1931).

Fam. Ophiocephalidae.

113. *Ophiocephalus striatus* BL.

2 spec., 15 cm. July 1930. Padang Tikarbay; 8 spec., 3 - 4 cm. July 1930. Padang Tikarbay; 3 spec., 17 - 18 cm. Aug. 1930. Sungei Terentang. Leg. C.

DE R.; 1 spec., 50 cm. July 1930. Middle course of Kapuas; 1 spec., 37 cm. Nov. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ruan or gabus. In the middle course of the river this species seems to be rare. In the lower course it is much more common. Heighly esteemed by the natives, they eat it fresh or salted and dried.

Furthermore I got one specimen from the Karimata islands.

114. *Ophiocephalus gachua* H.B.

3 spec., 10 - 13 cm. Rivulets of the Gunung Ambawang; 1 spec., 11 cm. Nov. 1930. Rivulets of the Gunung Ambawang. Leg. C. DE R.

115. *Ophiocephalus pleurophthalmus* BLKR.

5 spec., 29 - 33 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Kĕrandung. Common.

116. *Ophiocephalus lucius* (K. v. H.) C.V.

5 spec., 27 - 31 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Runtuk. Common.

117. *Ophiocephalus micropeltis* (K. v. H.) C.V.

3 spec., 22 cm. July 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ikan toman.

Fam. Anabantidae.

118. *Anabas testudineus* (BL.).

2 spec., 9 - 13 cm. April 1930. Padang Tikar; 1 spec., 10 cm. June 1930. Fishmarket Pontianak. Leg. C. DE R.

Native name: Ikan puju puju.

119. *Polyacanthus hasselti* C.V.

1 spec., 13 cm. June 1930. Fishmarket Pontianak; 1 spec., 8 cm. July 1930. Sungei Terentang; 9 spec., 6 - 12 cm. August 1930. Sungei Terentang; 2 spec., 8 cm. Sept. 1930. Sungei Terentang. Leg. C. DE R.

A very common species.

120. *Helostoma temmincki* C.V.

1 spec., 8 cm. 18-5-1930. Padang Tikar; 1 spec., 11 cm. June 1930. Padang Tikar. Leg. C. DE R.; 1 spec., 19 cm. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ikan Biawan. Common species. Eaten fresh and salted. The roe is salted separately.

121. *Osphronemus goramy* LAC.

A single juvenile specimen from Pontianak. Leg. C. DE R.

122. *Betta anabatoides* BLKR.

1 spec., 79 cm. Sept. 1930. Gunung Ambawang; 5 spec., 77 - 104 mm. Nov. 1930. Gunung Ambawang. Leg. C. DE R.

123. *Trichopodus trichopterus* (PALL.).

11 spec., 4 - 8 cm. 8-5-1930. Padang Tikar; 10 spec., 5 - 9 cm. August 1930. Sungei Terentang. Leg. C. DE R.

Native name: Ikan sĕpat. Very common species. Salted in great quantities.

124. *Trichopodus leeri* (BLKR.).

2 spec., 8 - 9 cm. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ikan sĕpat. In contrast with *Tr. trichopterus* this species is mostly not eaten. Not so common.

Fam. Luciocephalidae.

125. *Luciocephalus pulcher* (GRAY).

1 spec., 12 cm. Sept. 1930. Gunung Ambawang. Leg. C. DE R.

Fam. Bothidae.

126. *Pseudorhombus arsius* (H.B.).

1 spec., 14 cm. July 1930. Padang Tikarbay; 1 spec., 18 cm. October 1930. Fishmarket Pontianak; 4 spec., 11 - 12 cm. 29-10-1930. Mouth of Peniti-river. Leg. C. DE R.

Native name: Ikan seblah. The smaller specimens show the spots on the coloured side more conspicuous than the bigger ones.

Fam. Soleidae.

127. *Solea humilis* CANTOR (*Solea ovata* RICH).

1 spec., 7 cm. 14-4-1930. Sungei Kakap. Leg. C. DE R.

128. *Synaptura panoides* BLKR. (*Brachirus panoides* (BLKR.)).

1 spec., 17 cm. June 1930. Padang Tikarbay; 1 spec., 14 cm. October 1930. Fishmarket Pontianak. Leg. C. DE R.

129 *Achiroides melanorhynchus* (BLKR.).

1 spec., 6 cm. April 1930. Padang Tikarbay. Leg. C. DE R.

130. *Cynoglossus lingua* HAM. BUCH.

1 spec., 23 cm. July 1930. Padang Tikarbay. Leg. C. DE R.

131. *Cynoglossus puncticeps* (RICH.).

2 spec., 7 cm. 14-9-1930. Peniti-river; 1 spec., 9 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

132. *Cynoglossus monopus* (BLKR.).

1 spec., 10 cm. 14-4-1930. Sungei Kakap. Leg. C. DE R.

133. *Cynoglossus oligolepis* (BLKR.).

1 spec., 12 cm. October 1930. Fishmarket Pontianak. Leg. C. DE R.

134. *Cynoglossus borneensis* (BLKR.).

1 spec., 19 cm. 19-10-1930. Peniti-river. Leg. C. DE R.

A detailed description of this rare species will follow below.

D. 110; A. 86; V. 4; L.l. 110.

Lanceolate. Height 5.0 in total length. Head rounded, 5.0 in total length. Eyes 10 in head, upper one slightly in advance of the lower. Anterior nostril tubular near upper lip, the posterior one between eyes. Interorbital space about twice in eyes. Nostrils on blind side with very short tubes. Hook of upper jaw far in front of eyes. Corner of mouth somewhat behind hindborder of posterior eye, about midway between tip of snout and branchial opening. Scales etenoid on coloured side. Two lateral lines on coloured side separated by 20 rows of

scales. One lateral line on blind side. Brownish above, whitish below. A large dark patch on opercular region. A broad darkish band along median lateral line. A darkish line at some distance below and above the median band. (The colouration is taken from the specimen in formaline).

Fam. Apogonidae.

135. *Apogon hyalosoma* BLKR.

1 spec., 11 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Fam. Centropomidae.

136. *Lates calcarifer* (BL.).

1 spec., 22 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.

Native name: Ikan Kakap. A highly esteemed foodfish. Very common in rivermouths.

137. *Ambassis gymnocephalus* (LAC.).

2 spec., 5 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.

Native name: Ikan sèrinding, which is the name for most *Ambassis* species. Common.

138. *Ambassis buruensis* BLKR.

1 spec., 5 cm. 18-5-1930. Padang Tikarbay. Leg. C. DE R.

A much less common species than the former.

139. *Ambassis wolffi* BLKR.

1 spec., 6 cm. April 1930. Padang Tikarbay; 1 spec., 12 cm. June 1930. Pontianak; 2 spec., 7 - 8 cm. June 1930. Padang Tikarbay; 2 spec., 7 - 8 cm. July 1930. Sungei Terentang; 1 spec., 7 cm. August 1930. Sungei Terentang. Leg. C. DE R.

140. *Ambassis apogonoides* BLKR.

1 spec., 6 cm. June 1930. Padang Tikarbay. Leg. C. DE R.

141. *Ambassis interrupta* BLKR.

2 spec., 6 cm. June 1930. Padang Tikarbay; 1 spec., 5 cm. July 1930. Sungei Terentang; 2 spec., 6 cm. Sept. 1930. Telok Pekadai; 1 spec., 9 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

142. *Ambassis macrolepis* (BLKR.).

3 spec., 4 - 9 cm. July 1930. Sungei Terentang. Leg. C. DE R.

Native name: Senara.

143. *Ambassis miops* GTHR.

1 spec., 8 cm. July 1930. Padang Tikarbay. Leg. C. DE R.

Hitherto only known in the eastern part of the Indo Australian Archipelago, though, as a matter of fact, its occurrence in the western part might be expected as it is found as far West as Madras.

144. *Ambassis nalua* (HAM. BUCH.).

2 spec., 11 cm. 14 Sept. 1930. Peniti-river; 1 spec., 8 cm. 29 October 1930. Peniti-river. Leg. C. DE R.

A common species.

145. *Ambassis commersonii* C.V.
2 spec., 9 - 10 cm. Nov. 1930. Telok Pakadai. Leg. C. DE R.
146. *Ambassis kopsii* BLKR.
1 spec., 7 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Fam. Serranidae.
147. *Epinephelus bontoides* (BLKR.).
1 spec., 19 cm. Dec. 1930. Fishmarket Pontianak. Leg. C. DE R.
A rare species. Hithertho not known on the coast of Borneo.
Native name: Kerapu, a name, which is given to all Epinephelus-species.
148. *Epinephelus nebulosus* (C.V.).
1 spec., 8 cm. 18 May 1930. Padang Tikarbay. Leg. C. DE R.

Fam. Theraponidae.
149. *Therapon theraps* C.V.
1 spec., 12 cm. July 1930. Sungei Kakap. Leg. C. DE R.
Native name: Ikan Kerrong Kerrong. It is this species which produces the peculiar sounds in tidal rivers [1]).
150. *Therapon jarbua* (FORSK.).
1 spec., 9 - 10 cm. Sept. 1930. Telok Pangpang. Leg. C. DE R.
Less common than *Therapon theraps*. Most probably *Therapon jarbua* is able to produce the same noise as the former species.

Fam. Sillaginidae.
151. *Sillago sihama* (FORSK.).
1 spec., 19 cm. July 1930. Padang Tikarbay; 1 spec., 11 cm. August 1930. Sungei Terentang; 1 spec., 14 cm. October 1930. Fishmarket Pontianak; 6 spec., 10 - 13 cm. Nov. 1930. Telok Pekadai; 1 spec., 10 cm. 5 October 1930. Peniti-river. Leg. C. DE R.

Fam. Carangidae.
152. *Megalaspis cordyla* (L.).
1 spec., 18 cm. July 1930. Padang Tikarbay; 2 spec., 13 cm. Sept. 1930. Telok Pekadai; 1 spec., 12 cm. Sept. 1930. Sungei Terentang; 1 spec., 12 cm. Sept. 1930. Peniti-river. Leg. C. DE R.
153. *Caranx* (*Caranx*) *sexfaciatus* Q.G.
1 spec., 12 cm. August. 1930. Sungei Terentang; 2 spec., 11 - 12 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.
Native name: Selar. One of the few Carangids which enter tidal rivers.
154. *Caranx* (*Selar*) *kalla* C.V.
2 spec., 11 - 12 cm. Sept. 1930. Peniti-river; 2 spec., 6 cm. Sept. 1930. Telok Pekadai; 1 spec , 7 cm. Nov. Telok Pekadai. Leg. C. DE R.
The young of this common species may enter tidal rivers.

[1]) See HARDENBERG, Zoöl. Anzeiger 1934, Bnd 108, p. 224-227.

155. *Caranx (Carangoides) praeustus* BENN.

1 spec., 11 cm. Sept. 1930. Peniti-river. Leg. C. DE R.

156. *Atropus atropus* (BL. SCHN.).

1 spec., 15 cm. July 1930. Sungei Kakap; 1 spec., 12 cm. Sept. 1930. Sungei Kakap; 2 spec., 11 cm. Sept. 1930. Peniti-river. Leg. C. DE R.

Regularly found before and in tidal rivers.

157. *Alectis indica* (RÜPP.).

1 spec., 8 cm. July 1930. Sungei Kakap; 1 spec., 12 cm. Sept. 1930. Peniti-river. Leg. C. DE R.

158. *Chorinemus lysan* (FORSK.).

1 spec., 18 cm. July 1930. Padang Tikarbay; 1 spec., 18 cm. Sept. 1930. Peniti-river. Leg. C. DE R.

159. *Chorinemus tala* (C.V.). DAY.

1 spec., 14 cm. Sept. 1930. Peniti-river; 2 spec., 13 - 15 cm. Sept. 1930. Telok Pekadai; 3 spec., 13 - 16 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

160. *Chorinemus tol* C.V.

1 spec., 14 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.

Fam. Lactariidae.

161. *Lactarius lactarius* (BL. SCHN.).

1 spec., 12 cm. June 1930. Padang Tikarbay; 2 spec., 11 cm. Sept. 1930. Telok Pakadai; 1 spec., 8 cm. Sept. 1930. Peniti-river. Leg. C. DE R.

Fam. Leiognathidae.

162. *Leiognathus ruconius* (H.B.).

2 spec., 5 cm. May 1930. Padang Tikarbay; 1 spec., 11 cm. August 1930. Peniti-river; 3 spec., 4 - 6 cm. Nov. 1930. Telok Pekadai; 1 spec., 10 cm. Nov. 1930. Sungei Kakap. Leg. C. DE R.

163. *Leiognathus brevirostris* (C.V. (DAY)).

1 spec., 9.5 cm. June 1930. Padang Tikarbay; 1 spec., 10.5 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.

D. VIII 15; A. III 14; L.l. ± 60.

Compressed. Dorsal profile about equally convex as ventral profile. The rostro-dorsal profile ascends in a more or less straight line with a slight concavity above the eyes and without a strong nuchal elevation. Head 3.1 (3.8), height 2.1 (2.6) in length. (The numbers between brackets relate to the total length, with the caudal included). Eyes 3.6 in length of head, about as long as snout and equal to interorbital space. Interorbital cavity about twice as long as broad. A pair of well developed spines at the anterior superior angle of eye. Supraorbital edge finely serrated. The interorbital cavity is bordered by the smooth supraorbital ridges, which are the continuation of the nuchal spine, which is much longer than eye. Lips thick. Gape of mouth opposite to lower border of eye. Maxillary reaches to just behind frontborder of eye. Lower jaw concave inferiorly. Lower border of praeoperculum rather strongly

denticulated. Fine teeth in a narrow band in upper and lower jaw. 16 Gillrakers on lower branch of first gill-arch which goes about 4 times in eye. Scales minute, wanting on head and breast and chest. Lateral line ending a little before caudal. Second dorsal spine longest, about 2.7 in length of body. Third dorsal spine serrated anteriorly, fourth one smooth. Second anal spine longest, about 3.4 in length of body. Third anal spine serrated anteriorly, fourth smooth. Pectoral 1.4 in head. Colour of formaline specimens grayish, with traces of irregular dark vertical bands. Axil of pectorals blackish. A faint blackish blotch on spinous dorsal. A black blotch on nuchal spine. A broad blackish streak on snout and a narrow one on shoulder-girdle just behind branchial opening.

It is only with some hesitation that I have given the above mentioned specimens the name of *Leiognathus brevirostris,* a species which, according to literature, is very rare. *L. brevirostris* should have the gape of the snout opposite to the lower third part of the eyes, and it is below the lower border in my specimens. The dorsal profile however, which is not steep, the positively naked breast, the lateral line, which is continued to base of caudal, point all in the direction of *L. brevirostris.* The finely serrated supraobital edge and the presence of the two rather strong nasal spines show that we have not to do here with *L. daura,* which moreover has a lateral line not reaching so far backwards. Thus, after all, I consider it justified to call the above mentioned specimens *L. brevirostris.*

164. *Leiognathus splendens* (CUV.).

1 spec., 5 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.

165. *Leiognathus equulus* (FORSK.).

2 spec., 7 cm. July 1930. Sungei Terentang; 9 spec., 2.5 - 8 cm. August. 1930. Sungei Terentang; 1 spec., 12 cm. Sept. 1930. Peniti-river; 6 spec., 5.5 - 7.5 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

166. *Leiognathus dussumierii* (C.V.)?

1 spec., 5.7 cm. August 1930. Sungei Terentang. Leg. C. DE R.

This very young specimen has only fully developed scales on the upper part of the body and on the caudal peduncle. From thereon the scales are diminuishing gradually towards the breast, so that about the whole abdomen is destitute of scales. The naked area therefore is far greater than in any other species of *Leiognathus.* When I give this specimen the name of *L. dussumierii,* it is only because the other features quite agree with the description of this species. Perhaps in bigger animals the breast and chest are more conspicuously scaled.

167. *Gerres abbreviatus* BLKR.

2 spec., 5 - 8 cm. May 1930. Padang Tikarbay; 1 spec., 12 cm. Sept. 1930. Sungei Kakap; 2 spec., 8 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Kapas Kapas.

168. *Gerres punctatus* C.V.

1 spec., 9 cm. Sept. 1930. Telok Pekadai. Leg. C. DE R.

Fam. Mullidae.

169. *Upeneus sulphureus* C.V.

1 spec., 13 cm. July 1930. Sungei Kakap; 1 spec., 13 cm. Sept. 1930. Sungei Kakap Leg. C. DE R.

Fam. Pristipomatidae.

170. *Pristipoma maculatum* BLOCH.

1 spec., 9 cm. June 1930. Padang Tikarbay; 1 spec., 10 cm. October 1930. Mouth Peniti-river. Leg. C. DE R.

171. *Pristipoma hasta* BLOCH.

1 spec., 11 cm. June 1930. Padang Tikarbay; 2 spec., 11 - 12 cm. Sept. 1930. Telok Pekadai; 2 spec., 9 - 10 cm. Nov. Telok Pekadai. Leg. C. DE R.

Pristipoma hasta as well as *Pristipoma maculatum* are regular visitors of the brackish waters.

Fam. Lutjanidae.

172. *Lutjanus johnii* (BLOCH).

1 spec., 3 cm. July 1930. Padang Tikarbar; 1 spec., 9 cm. August 1930. Sungei Terentang; 2 spec., 9 - 10 cm. Oct. 1930. Mouth Peniti-river; 3 spec., 10 - 15 cm. Nov. 1930. Telok Pekadai; 1 spec., 16 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

A regular visitor, though in small numbers, of rivermouths. By far the most common *Lutjanus* in such regions.

Fam. Datnioidae.

173. *Datnioides polota* (HAM. BUCH.).

1 spec., 12 cm. May 1930. Padang Tikarbay. (Batu Ampar); 1 spec., 8.5 cm. July 1930. Sungei Terentang; 1 spec., 12 cm. July 1930. Sungei Kakap; 1 spec., 5 cm. Oct. 1930. Fishmarket Pontianak; 2 spec., 13 - 14 cm. Nov. 1930. Sungei Terentang. Leg. C. DE R.; 2 spec., 19 - 20 cm. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ringau.

Fam. Toxotidae.

174. *Toxotes chatareus* (HAM. BUCH.).

2 spec., 11 - 12 cm. May 1930. Padang Tikarbay. (Batu Ampar); 2 spec., 9 cm. July 1930. Padang Tikarbay; 1 spec., 6 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Ikan sumpit. Rather common in small creeks in the lower course of the big rivers of Sumatra and Borneo.

175. *Toxotes microlepis* GÜNTHER.

1 spec., 13 cm. June 1930. Fishmarket Pontianak; 3 spec., 11 - 13 cm. Aug. 1930. Sungei Terentang; 1 spec., 7 cm. Oct. 1930. Fishmarket Pontianak. Leg. C. DE R.

Native name: Ikan sumpit.

Fam. Scatophagidae.

176. *Scatophagus argus* (L.).

2 spec., 4 - 5 cm. June 1930. Padang Tikarbay; 2 spec., 2 - 5 cm. July 1930. Sungei Terentang; 1 spec., 7 cm. July 1930. Fishmarket Pontianak; 2 spec., 5 - 11 cm. Aug. 1930. Sungei Terentang; 1 spec., 5 cm. Sept. 1930. Sungei Terentang; 2 spec., 4 cm. Sept. 1930. Telok Pekadai; 1 spec., 5 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Ikan kiper or kètang kètang. Common. The young live in small shoals of a few specimens or sometimes more, in small creeks and inlets, close to the shore. Mature specimens live farther out in sea, although in all probability never more than a few hundreds yards from the coast.

Fam. Drepanichthyidae.

177. *Drepanichthys punctatus* (L.).

1 spec., 12 cm. July 1930. Padang Tikarbay; 4 spec., 8 - 9 cm. Aug. 1930. Sungei Terentang; 3 spec., 7 - 10 cm. Sept. 1930. Mouth Peniti-river; 2 spec., 7 - 9 cm. Sept. 1930. Telok Pekadai; 4 spec., 7 - 9 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Native name: Ikan tapi tapi.

Fam. Ephippidae.

178. *Ephippium orbis* BLOCH.

1 spec., 8 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.

A rare species.

Fam. Girellidae.

179. *Proteracanthus sarissophorus* CANTOR.

1 spec., 13 cm. October 1930. Mouth Peniti-river. Leg. C. DE R.

Single individuals of this curious fish are regularly found in some rivermouths as for instance those of the Rokan and Panei in Sumatra and the Kapuas in Borneo. In front of other rivermouths, as the Musi in South Sumatra, this species seems to be absent althogether for no apparent reason.

Fam. Nandidae.

180. *Nandus nebulosus* BLKR.

1 spec., 95 cm. Sept. 1930. Gunung Ambawang. Leg. C. DE R.

181. *Pristolepis fasciata* (BLKR.).

2 spec., 12 - 13 cm. 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Patung.

I have hesitated to give these specimens the name *Pristolepis fasciata,* but Prof. Dr. MAX WEBER assured me that the name was quite correct. As a matter of fact the numbers of scales and finrays and the measurements of head, body and so on are quite in accordance with the descriptions in literature. The colouration however is quite different. My specimens are brownish red. The

black spot in the axilla is wanting. On the innerside of the operculum is found a black spot shining through at the outside, a spot which is not mentioned in literature. There are no traces of vertical bands, which however may have disappeared in the formaline.

Fam. Kurtidae.

182. *Kurtus indicus* BLOCH.

1 spec. 12 cm. June 1930. Padang Tikarbay; 2 spec., 13 - 14 cm. Sept. 1930. Sungei Kakap; 2 spec., 9 - 12 cm. Sept. 1930. Mouth Peniti-river; 1 spec., 10 cm. Nov. 1930. Sungei Kakap. Leg. C. DE R.

A very common species in front off rivermouths. It is curious to remember that with the closely related *Kurtus gulliveri* CASTELNAU the male has a hook on the head, to which the eggs are fastened. Although I have seen thousands of individuals of *Kurtus indicus,* which has the hook on the head too, I have never found a specimen, with eggs. The mode of propagation seems therefore to be different of *K. gulliveri.*

Fam. Sciaenidae.

183. *Johnius sina.* (CUVIER.). (*Sciaena vogleri* (BLKR.)).

1 spec., 11 - 13 cm. May 1930. Padang Tikarbay; 1 spec., 13 cm. July 1930. Fishmarket Pontianak; 1 spec., 13 cm. Nov. 1930. Telok Pekadai; 2 spec., 13 - 14 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Native name: Ikan samgeh or gulamah.

184. **Johnius weberi** nov. spec.

D. X I. 27; A. II. 7; P. 16; V. 6. Tubular scales in lateral line 51 (those on caudal not counted).

Low slender body. Height 4, head 3.5 in length without caudal. Snout 2.7, eye 4 in head. The eye goes about twice in postorbital part of head. Nostrils just in front of eye. Snout much longer than upper jaw. Crescentic mouth inferior, lower jaw included by upper. 5 pores on chin. On lower side of snout 4 - 5 tentacle-like flaps of skin. Praeoperculum with fine remote denticulations. A band of villiform teeth in both jaws. 5 à 6 rows of scales above lateral line, 14 - 15 below. Second dorsal spine longest, somewhat longer than postorbital part of head. Last rays of soft dorsal highest. Second anal spine strong, about as long as snout and half eye. Pectorals as well as ventrals about 5½ in length of head and body. Colour brownish, lighter beneath. Each scale has a darker hindborder. Spinous dorsal darkish. Black patch on inner side operculum shining through.

The above description is made after a specimen of 140 mm. from Telok Pekadai.

2 spec., 122 and 140 mm. Telok Pekadai. Sept. 1930; 2 spec., 75 and 118 mm. Mouth Peniti-river. Sept. 1930; 2 spec., 133 and 140 mm. Padang Tikarbay. Nov. 1930. Leg. C. DE R.

185. *Johnius coiber* (HAM. BUCH.).
1 spec., Sept. 1930. Sungei Kakap. Leg. C. DE R.
A common species.
186. *Johnius cujus* (HAM. BUCH.).
1 spec., 22 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.
187. *Sciaena* (*Umbrina*) *macroptera* (BLKR.).
1 spec., 11 cm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.
Sciaena (*Umbrina*) species are rather rare in front of rivermouths.
188. *Otolithoides biauritus* (CANTOR).
1 spec., 14 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.
A very common species in front of rivermouths.

Fam. Trichiuridae.
189. *Trichiurus glossodon* BLKR.
1 spec., 67 cm. July 1930. Padang Tikarbay; 1 spec., 38 cm. Nov. 1930. Telok Pakadai. Leg. C. DE R.
190. *Trichiurus savala* (C.V.).
1 spec., 38 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

Fam. Scombridae.
191. *Scomber neglectus* v. KAMPEN.
2 spec., 10 cm. Sept. 1930. Mouth Peniti-river; 2 spec., 12 - 13 cm. Sept. 1930. Telok Pakadai; 3 spec., 14 cm. Nov. 1930. Telok Pekadai; 1 spec., 12 cm. July 1930. Sungei Kakap. Leg. C. DE R.
192. *Scomberomorus kühli* (C.V.).
1 spec., 22 cm. July 1930. Padang Tikarbay. Leg. C. DE R.
193. *Scomberomorus guttatus* (BL. SCHN.).
1 spec., 16 cm. Sept. 1930. Sungei Kakap. Leg. C. DE R.
Native name: Tengiri which is the name for all *Scomberomorus* spec.
194. *Scomberomorus commersoni* LACEP.
1 spec., 15 cm. Sept. 1930. Mouth Peniti-river. Leg. C. DE R.

Fam. Cottidae.
195. *Platycephalus scaber* L.
1 spec., 14 cm. July 1930. Sungei Kakap. Leg. C. DE R.

Fam. Gobiidae.
196. *Brachygobius doriae* (GTHR.).
2 spec., 32 - 36 mm. March 1930. Pontianak; 3 spec., 26 - 34 mm. April 1930. Padang Tikarbay; 9 spec., 29 - 42 mm. June 1930. Pontianak; 2 spec., 28 - 28 mm. Aug. 1930. Kubu Terentang; 1 spec., 38 mm. Sept. 1930. Telok Pekadai. Leg. C. DE R.
Common in shallow pools and ditches. This species seems to feed for the greater part on mosquito-larvae. A very handsome fish with its black and orange banded body.

197. *Stigmatogobius javanicus* (Blkr.).

2 spec., ± 55 mm. May 1930. Padang Tikarbay. Leg. C. de R.

198. *Stigmatogobius tambujan* (Blkr.).

1 spec., 29 mm. March 1930. Pontianak; 1 spec., 25 mm. Sept. 1930. Gunung Ambawang. Leg. C. de R.

199. *Stigmatogobius borneensis* (Blkr.).

1 spec., 38 mm. July 1930. Pontianak. Leg. C. de R.

200. *Glossogobius giurus* (H.B.).

1 spec., 128 mm. June 1930. Padang Tikarbay; 1 spec., 148 mm. July 1930. Padang Tikarbay; 1 spec., 143 mm. Aug. 1930. Sungei Terentang; 1 spec., 188 mm. Dec. 1930. Pontianak. Leg. C. de R.

A common species in brackish water and in mangrove swamps. One of the species of *Gobius* which are big enough to have some, although small, economical value.

201. *Acentrogobius caninus* (C.V.).

1 spec., 161 mm. May 1930. Padang Tikarbay. Leg. C. de R.

202. *Periophthalmodon borneensis* (Blkr.).

1 spec., 105 mm. May 1930. Padang Tikarbay. Leg. C. de R.

203. *Periophthalmodon schlosseri* (Pall.).

1 spec., ± 190 mm. May 1930. Padang Tikarbay. Leg. C. de R.

204. *Periophthalmus koelreuteri* (Pall.).

1 spec., 62 mm. July 1930. Padang Tikarbay. Leg. C. de R.

205. *Boleophthalmus boddaerti* (Pall.).

1 spec., 136 mm. May 1930. Padang Tikarbay. Leg. C. de R.

Native name: Ikan tembakul.

206. *Parapocryptus macrolepis* (Blkr.).

1 spec., 86 mm. May 1930. Padang Tikarbay. Leg. C. de R.

Dr. Koumans of the Leyden Museum, who was so kind as to give me the name of this specimen, was not quite sure of his identification, as the measurements were not quite the same as given in literature.

Fam. Eleotridae.

207. *Oxyeleotris boddaerti* Blkr.

1 spec., 89 mm. April 1930. Padang Tikarbay; 1 spec., 81 mm. Aug. 1930. Sungei Terentang. Leg. C. de R.

208. *Oxyeleotris urophthalmus* (Blkr.).

1 spec., 160 mm. May 1930. Padang Tikarbay. Leg. C. de R.

209. *Oxyeleotris marmorata* Blkr.

1 spec., 273 mm. June 1930. Padang Tikarbay. Leg. C. de R.; 1 spec., from the middle course of the Kapuas. Leg. de Mol.

Native name: Batutuk.

210. *Ophiocara porocephalus* (C.V.).

2 spec., 70 - 72 and 165 mm. May 1930. Padang Tikarbay. Leg. C. de R.

211. *Butis melanostigma* (BLKR.).

1 spec., 100 mm. July 1930. Kapuas; 1 spec., 49 mm. Aug. 1930. Kubu Terentang. Leg. C. DE R.

212. *Butis amboinensis* (BLKR.).

1 spec., 25 mm. Aug. 1930. Kubu Terentang. Leg. C. DE R.

Fam. Callionymidae.

213. *Callionymus fluviatilis* DAY.

1 spec., 73 mm. Nov. 1930. Padang Tikarbay. Leg. C. DE R.

Fam. Rhynchobdellidae.

214. *Mastamcembelus maculatus* (C.V.)?

1 spec., 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Tilan balabon.

Fam. Gymnodontes.

215. *Xenopterus naritus* RICH.

1 spec., 8 cm. Sept. 1930. Mouth of Ambawangriver. Leg. C. DE R.; 1 spec., 1932. Middle course of Kapuas. Leg. DE MOL.

Native name: Ikan buntal lemas. The name buntal is given to all gymnodonts.

216. *Tetrodon lunaris* BL. SCHN.

8 spec., 6 - 75 mm Sept. 1930. Mouth of Ambawangriver; 1 spec., 85 mm. Oct. 1930. Pontianak; 2 spec., 85 - 90 mm. Oct. 1930. Peniti-river; 3 spec., 93 - 105 mm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

217. *Tetrodon oblongus* BLOCH.

8 spec., 56 - 68 mm. Sept. 1930. Mouth of Ambawangriver. Leg. C. DE R.

218. *Tetrodon palembangensis* (BLKR.).

3 spec., 10 - 28 cm. 1932. Middle course of Kapuas. Leg. C. DE MOL.

219. *Tetrodon fluviatilis* HAM. BUCH.

3 spec., 17 - 85 mm. May 1930. Padang Tikarbay; 1 spec., 38 mm. July 1930. Sungei Terentang; 1 spec., 82 mm. Sept. 1930. Telok Pekadai; 5 spec., 58 - 80 mm. Sept. 1930. Mouth of Ambawangriver; 4 spec., 50 - 62 mm. Oct. 1930. Peniti-river. Leg. C. DE R.

Fam. Carcharinidae.

220. *Physodon mülleri* (MÜLLER and HENLE.).

2 spec., 19 cm. Nov. 1930. Telok Pekadai. Leg. C. DE R.

221. *Scoliodon palasorrah* (RUSSELL.).

1 spec., 34 cm. July 1930. Fishmarket Pontianak. Leg. C. DE R.

Fam. Myliobatidae.

222. *Aëtomylaeus maculatus* (GRAY and HARW.).

1 spec., 64 cm. (tail included) Dec. 1930. Fishmarket Pontianak. Leg. C. DE R.

HERPETOLOGISCHE NOTIZEN XII—XV [1]).

Von

Dr. F. KOPSTEIN

(Magelang, Java).

XII. Ein Beitrag zur Herpetofauna von Celebes.

Herr MOHAMAD MANSJOER, Gouvernements-Tierarzt in Makale, Loewoe, Central-Celebes, sammelte in den Jahren 1934/35 eine Reihe von Schlangen, welche an das Zoologische Museum in Buitenzorg abgetreten und mir zur Bearbeitung überlassen wurde. Diese Kollektion enthält u.a. die erste *Naja naja* von Celebes, ferner eine neue Unterart von *Boiga dendrophila* und noch einiges andere Bemerkenswerte, und soll darum hier einer kurzen Beschreibung unterzogen werden.

Cylindrophis rufus (LAUR.).

1 juv.; Kaloka; VI. 1935.

Dendrelaphis pictus pictus (GMELIN).

1 ad ♀; Botang, Makale; 22. XI. 1934.

Sq. 15-15-11; V. 171 + 1/1; Sc. 134/134 + 1; Lg. 63 + 34 cm.

1 Prae-, 3 Postocularia. Temporalia 1 + 2. Supralabiala 9. 5 Sublabialia in Berührung mit dem vorderen Kinnschildpaar.

Dendrelaphis pictus nov. subsp.?

1 ad.; Malili, Distrikt Lelewawoe; IX. 1935.

Sq. 15-15-15; V. 166 + 1/1; Sc. 140/140 + 1.

Internasalia viel kürzer als die Praefrontalia. Supralabialia 9 (5, 6). 5 Sublabialia berühren das vordere Kinnschildpaar. Die vertebralen Schuppen stark vergrössert, hexagonal, grösser als alle anderen Schuppenreihen.

Dieses Exemplar ist zu stark beschädigt, um die morphologischen Merkmale und ganz besonders die Zeichnung vollständig beschreiben zu können. Die helle Seitenlinie ist gut sichtbar und in der distalen Körperhälfte beiderseits von einer schwarzen Linie eingesäumt. Der schwarze Postocularstreifen setzt sich auf die Halsseiten fort. Alle Rumpfschuppen, besonders jene der Körpermitte, tragen helle Zentren, so dass einigermassen das Farbenbild von *Chrysopelea* geschaffen wird. Mageninhalt: ein *Rhacophorus leucomystax*.

[1]) Cfr. Treubia, Vol. X, p. 467; Vol. XI, p. 301; Vol. XII, p. 273; Vol. XIII, p. 1; Vol. XIV, p. 73 und 78; Dl. 15, p. 51 und 151.

Natrix trianguligera (BOIE).

1 ad.; Makale; III. 1934.

Sq. 19; V. 142 + 1/1; Sc. 24/24 + ...;

1 Prae-, 4 Postocularia. Temporalia 2 + 2.

Mageninhalt: ein 6 cm langer *Rana*.

Natrix chrysargoides (GÜNTHER).

1 ad.; Mandandan, kampong Tonglo; 4. IX. 1935.

Sq. 21-21-17; V. 154 + 1/1; Sc. 69/69 + 1.

1 Prae-, 3 Postocularia. Temporalia 2 + 3. Supralabialia 9 (4, 5, 6).

6 Sublabialia in Kontakt mit dem vorderen Kinnschildpaar.

Elaphe janseni (BLEEKER).

1 ad. ♂; Makale; 25. V. 1935.

Sq. 21-23-17-15; V. 245 + 1/1; Sc. 133/133 + 1.

Schädel zertrümmert.

Oberseite vorne einfärbig hell gelbbraun. Auf dem 2. Viertel des Rumpfes kleine, schwarze Flecke auf den gelbbraunen, lateralen Schuppen. Im 3. Viertel seitlich schwarz, mit angedeuteten, gelblich-braunen Schrägbändern; oben gelblichbraun, mit kleinen, schwarzen Flecken auf den Schuppenspitzen. Das letzte Viertel schwarz, dorsal mit einzelnen hellgerandeten Schuppen. Kein seitliches Längsband. Unterseite des vordersten Drittels einfärbig gelblich. Ventralia des 2. Drittels seitlich mit schwarzen Kanten. Diese am Beginn kleinen, dunklen Ränder werden kaudalwärts grösser und gehen schliesslich in völliges schwarz über. Schwanz unten einfärbig schwarz. Oberseite des Schädels schwarz gewölkt.

Elaphe erythrura (D.B.).

1 ad. ♀; Minkindik; V. 1935.

Sq. 23-21-19; V. 223 + 1; Sc. 96/96; totale Länge 145 cm.

Reste der Jugendzeichnung vorhanden in Form von einigen schwarzen, vertikalen Flecken seitlich auf dem Halse.

Kein dunkler Fleck oder Streifen unter dem Auge. Keine V oder ⅄ Zeichnung auf dem Halse.

Lycodon aulicus capucinus BOIE.

1 ad.; Bone; VI. 1935.

Sq. 17-17-15; V. 188 + 1/1; Sc. 47/47 + 1.

Dieses Exemplar stimmt vollkommen mit der Beschreibung überein, welche MERTENS von der javanisch-kleinsundaischen Form gibt. Von meinen javanischen *Lycodon aulicus* unterscheidet es sich bloss durch etwas grössere dunkle Flecke auf den Supralabialen. Der weisse, über den oberen Teil des Rostrale verlaufende Supralabialstreifen ist deutlich vorhanden.

Mageninhalt: eine *Mabuia multifasciata*.

Boiga dendrophila atra nov. subsp.

2 ad.; Ba Eboenta, Makale; 27. VII. 1934.

1. — Type; Sq. 21-21-17; V. 235 + 1; Sc. 98/98 + 1; Länge 111 + 30 cm.

2. — Paratype; Sq. 21-21-15; V. 235 + 1; Sc. 83/83 + ... (Spitze defekt); Länge 113 + 27 cm.

3. — 1 ad. ♀; Palopo; 15. XII. 1934.

Paratype; Sq. 21-21-17; V. 232 + 1; Sc. 103/103 + 1; Länge 121 + 31 cm.

4. — 1 ad. ♂; Kaloka; VI. 1935.

Paratype; Sq. 21-21-15; V. 240 + 1; Sc. 105/105 + 1; Länge 101 + 28 cm.

Internasalia kürzer als die Praefrontalia. Frontale ebenso lang als sein Abstand vom Rostrale. 1 Prae-, 2 Postocularia. 1 Loreale. Temporalia 2 + 3. Supralabialia 8 (3, 4, 5). Sublabialia 11 (4). Vorderes Kinnschildpaar ebensolang als das zweite.

Färbung der Alkoholexemplare: Oben tief dunkel blauschwarz, irrisierend; unten einfärbig dunkel blaugrau. Bloss einzelne Kehlschilder und -schuppen zeigen Spuren von gelblicher Wölkung. *Von einer gelben Fleckenzeichnung fehlt jede Spur.*

B.d. atra ist am nächsten verwandt mit *B.d. melanota* (BLGR.), die nach BRONGERSMA (3) den östlichen Teil von Sumatra, die Malaiische Halbinsel und die Halbinsel Siam bewohnt. Bereits dieser Unterart ist eine deutliche Tendenz zum Melanismus inhärent, welche sich in einer mehr oder minder starken Reduktion der gelben Fleckenzeichnung manifestiert. Ganz besonders deutlich tritt dies zum Vorschein bei einem Exemplar, welches ich aus dem Hinterlande von Benkoelen (näherer Fundort unbekannt) erhielt und das hier wegen seiner auffallenden Verminderung der gelben Zeichnungselemente kurz beschrieben werden soll. Bei diesem Exemplar ist die markante, gelbe Fleckenzeichnung auf 4 laterale Fleckenpaare auf dem Halse beschränkt, welche nicht mehr als 2-6 Schuppen und einen Teil der angrenzenden Ventralia bedecken. Ein gleiches Fleckenpaar liegt seitlich auf dem Rumpfende, und 4 weitere auf dem Schwanze. Rostrale, Supra- und Sublabialia sind gelb mit schwarzen Rändern, die Kehle und die vordersten Ventralia einfärbig gelb, welche Farbe kaudalwärts vermindert und auf dem 23. Ventrale gänzlich verschwindet. Die Grundfarbe ist oben tief dunkel schwarz, unten dunkel grünlich schwarz. Sq. 21-21-15; V. 225 + 1; Sc. 99/99 + 1; Länge 137 + 36. Supralabialia 8 (3, 4, 5); 1 Prae-, 2 Postocularia.

Naja naja sputatrix (BOIE).

1 ad. ♀; Makale; VII. 1934.

Sq. 23-19-15; V. 170 + 1; Sc. 50/50 + 1; Länge 116 + 20 cm.

Sutur der Internasalia ½ der Länge der Sutur der Praefrontalia. Internasale vom Praeoculare durch ein akzessorisches Schild getrennt, welches kleiner ist als das Praeoculare und zwischen diesem, dem Supraoculare, Praefrontale, Internasale und Nasale liegt. 1 Prae-, 3 Postocularia. Frontale kürzer als seine Entfernung vom Rostrale, breiter als das Supraoculare. Temporalia links

2 + 3, rechts undeutlich. Supralabialia 7 (3, 4), das 3. am höchsten, das 5. in Kontakt mit dem untersten Postoculare. 4 Sublabialia berühren jederseits das vordere Kinnschildpaar, welches länger und breiter ist als das folgende.

Färbung des Spiritusexemplares: Oberseite einfärbig schwarz, unten einfärbig dunkel grau. Von einer Nackenzeichnung fehlt jede Spur.

Die Schuppenzahlen dieses Exemplares sprechen dafür, dass *Naja naja sputatrix* von Celebes sich der klein-sundaischen Rasse im Sinne von MERTENS (1) anschliesst. In welchem Verhältniss es zu *Naja celebensis* AHL (2) steht, wird erst ein grösseres Untersuchungsmaterial ausweisen können. AHL führt als augenfälligen Unterschied zwischen *Naja naja* und *Naja celebensis* an, dass bei ersterer die Internasalia mit dem Praeoculare zusammenstossen, bei *Naja celebensis* aber weit voneinander getrennt sind. Merkwürdigerweise berühren aber auch bei dem vorliegenden Exemplar von *N.n. sputatrix* das Internasale und Praeoculare einander nicht, was bei der javanischen *sputatrix* wohl der Fall ist.

Soweit es sich nachgehen lässt, ist das hier beschriebene Exemplar die erste *N.n. sputatrix* von Celebes. Von dieser Insel sind gegenwärtig 3 *Naja*-Arten bekannt u. zw. *Naja naja sputatrix* (BOIE), *Naja celebensis* AHL und *Naja hannah* (CANTOR).

Mageninhalt: ein Konvolut von Rattenharen.

Naja hannah (CANTOR).

1 s.ad.; Makale; IV. V. 1934.

Sq. 19-15-15; V. 247 + 1; Sc. 6 + 8/8 + 3 + 5/5 + 3 + 62/62 + 1.

Oberseite einfärbig, tief schwarz, glänzend. Unten dunkel grauschwarz. Die vordersten 14 Ventralia sind weisslich gelb, die folgenden 12 weiss mit dunklen Flecken. Die Schuppen der beiden äussersten Reihen in der Halsgegend bis zur Höhe des 25. Ventrale mit weisslichen Flecken.

1 s.ad.; Paloppo; II. 1935.

Sq. 19-15-13; V. 258 + 1; Sc. 4 + 70/70 + ...

Trimeresurus wagleri (BOIE).

Kaloka; V. 1935.

1 s.ad.; Sq. 21-21-17; V. 143 + 1; Sc. 49/49 + 1.

1 s.ad.; Sq. 21-21-19; V. 144 + 1; Sc. 50/50 + ...

Supraoculare nicht zerteilt. Zwischen den Supraocularen 9-13 Schuppen. Internasalia vorhanden. 2 Postocularia. 1 langes, schmales Suboculare. Dieses durch 1 Schuppenreihe von den Supralabialen getrennt und nicht in Kontakt mit dem 3. Supralabiale. Supralabialia 9/9, 10/9, das 3. am längsten.

Dorsal 2 Reihen kleiner, bläulichweisser Flecke von der Grösse einer halben Schuppe oder weniger, mit darauffolgenden, braunen Schuppenenden. Diese Flecke liegen nebeneinander oder sind alternierend angeordnet. Auf dem Rumpfende oberseits statt der kleinen Flecke kurze, helle, hinten braungerandete Querbänder. Schwanzspitze rostbraun, dunkel und licht gebändert. Ventralia

und Subcaudalia mit dunklen Punkten. Ein braunes, oben hell gesäumtes Band zieht vom Nasale über das Auge bis über und hinter die Mundwinkel. Sonst ist die Schlange einfärbig, oben dünkler, seitlich und ventral heller grün gefärbt.

Diese beiden Stücke stimmen in hohem Masse mit einem s.ad. Exemplar von Poeloe Panembangan, Karimata-Archipel (4) überein, welches sich ebenfalls im Zoologischen Museum von Buitenzorg befindet. Neben diesen beiden jugendlichen Stücken enthält die Sammlung 1 erwachsenes Exemplar, welches durch seine Färbung von allen mir bisher bekannten *T. wagleri* am meisten abweicht:

1 ad.; Makale; IV. 1935.

Sq. 23-23-13; V. 143 + 1; Sc. 50/50 + 1.

Oben und unten einfärbig grün, dorsal dünkler als ventral. Schwanzspitze bräunlich, mit dünklerer Wölkung. Ein bläulicher Postocularstreifen eben erkennbar.

Da es sich um sehr schlecht erhaltenes Material handelt und es mir noch undeutlich ist, ob die weiss punktierten Stücke die Jugendform der einfärbig grünen, adulten *T. wagleri*-Unterart darstellen, lasse ich die Zugehörigkeit zu einer, wahrscheinlich neuen subspecies, vorläufig offen.

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XIII. Ueber *Vipera russellii* von Java.

Als Neuhaus im Dezember 1933 die seit 1896 von Java nicht mehr beschriebene *Vipera russellii* in Ost-Java wiederfand und mir das erste Exemplar mit der darüber handelnden Mitteilung (1) zur Durchsicht anbot, fielen mir wohl gleich einige Unterschiede auf mit der von Mertens (2, 3) aus Flores beschriebenen *limitis*-Rasse. Da aber von *limitis* bisher bloss ein einziges Exemplar beschrieben ist und zu diesem Zeitpunkt auch von Java bloss 1 Stück zum Vergleich herangezogen werden konnte, war es nicht gut möglich, diese Unterschiede festzulegen. Inzwischen glückte es aber im April 1934 Herrn Neuhaus, noch 2 Exemplare zu bekommen, welche er mir liebenswürdigerweise zum Studium überliess, wofür ich ihm auch an dieser Stelle meinen Dank ausdrücken will. Dadurch bin ich nun in der Lage, die Unterschiede zwischen den 3 javanischen *V. russellii* und *V.r. limitis* von Flores zu beschreiben.

1. — ad. ♀; Sq. 27-29-21; V. 162 + 1; Sc. 43/43 + ... (Spitze scheinbar abgebrochen). Totale Länge 980 mm; Schwanz 108 mm. Grösster Leibesumfang 166 mm; grösster Durchmesser 55 mm.

Rostrale mit 7 Schildern in Berührung u. zw. dem 1. Supralabiale, dem Nasorostrale und 3 kleinen, unregelmässigen Kopfschuppen. Zwischen den scharfgekielten, schmalen Supraocularen vorne 5, hinten 8 Schuppen. Rund um das Auge, einschliesslich des Supraoculare, rechts 14, links 15 Schuppen. Zwischen diesen und den Supralabialen liegen 2 Schuppenreihen (zwischen dem Auge und den Supralabialen also 3 Reihen). 11 Supralabialia; das 1. berührt das unterste Postnasale. 4 Sublabialia in Kontakt mit dem vorderen Kinnschildpaar.

Färbung und Zeichnung des lebenden Exemplares: Dorsal eine Reihe von 24 grossen, braun-schwarzen, rundlichen Flecken, welche von einem schwarzen, nach aussen zu hellen, gelblich-weissen Rand umringt sind. Diese Flecke sind bei *V.r. limitis* als oval angegeben, wie MERTENS' Photographie tatsächlich deutlich sehen lässt. Auf dem Schwanz verschmilzt diese Fleckenreihe zu einem Vertebralstreifen, welcher sich bis zur Schwanzspitze fortsetzt. Die Lateralreihe besteht aus gleichgefärbten und gleichgestalteten, aber etwas kleineren Flecken als die Dorsalreihe. Beide stehen zu einander alternierend. Die lateralen Flecken scheinen bei den javanischen Exemplaren wesentlich grösser zu sein als bei *limitis* von Flores und keineswegs undeutlich oder aufgelöst wie dorten. Auch die laterale Fleckenreihe setzt sich auf dem Schwanz als Lateralstreifen fort. Dorsolateral befindet sich eine Reihe kleinerer, verschieden grosser und verschieden gestalteter Flecke, bei welchen ein lichter Rand nur stellenweise angedeutet ist. Marginal folgt eine 7. Fleckenreihe, welche meist auf die Ventralia übergreift. An einigen Stellen findet eine Verschmelzung dieser Flecke statt.

Die Kopfzeichnung ist nicht im Sinne von *limitis* reduziert: die paarigen Occipitalflecke und der unpaare Interocularfleck (siehe die Photographie auf Tafel 3) sind gross, deutlich umgrenzt und von einem dunklen und lichten Rand umringt. Alle 3 Flecke entsprechen der Zeichnung des Rumpfes. Der Subocularfleck und der Postocularstreifen sind etwas weniger scharf ausgeprägt, aber immerhin vollkommen deutlich. Die Unterseite ist gelblich mit einer dichten, grauen Punktierung und durch zahlreiche, halbkreisförmige, dunkelgraue, scharfbegrenzte Flecke am Hinterrande der Ventralia ausgezeichnet.

In seiner Gestalt erscheint das ♀ auffallend plumper als auf MERTENS' Photographie des Exemplares von Flores. Ein Blick auf die beiden nebeneinander gelegten Abbildungen bestätigt dies sofort.

2. — Das 2. hier zu beschreibende Exemplar entspricht im grossen und ganzen der obigen Beschreibung.

s.ad. ♂; Sq. 29-29-21; V. 157 + 1; Sc. 53/53 + 1; totale Länge 695 mm; Schwanz 103 mm; grösster Umfang 92 mm; grösster Durchmesser 30 mm.

Der Habitus dieses Exemplares macht einen schlankeren Eindruck. Auch der Kopf ist schmäler. Das Rostrale steht mit 6 Schildchen in Berührung. Vorne 5, hinten 7 Schuppen zwischen den Supraocularen. Rechts 13, links 14 Schuppen rund um das Auge (inkl. dem Supraoculare).

Die dorsale Fleckenreihe umfasst 25 Flecke von derselben Färbung wie beim ♀, aber etwas mehr oval. Auf jeden Fall sind die Flecke auch hier wesentlich runder als bei dem ♂ von Poeloe Endeh. Mehrere Flecke der Dorsalreihe sind miteinander verschmolzen. Subocularfleck und Postocularstreifen sind etwas weniger deutlich ausgeprägt.

Zusammenfassend liegen die Unterschiede zwischen *V.r. limitis* von Flores und *Vipera russellii* von Java in folgendem:

Vipera russellii limitis von Flores	*Vipera russellii* subspec. von Java.
Kopf nur wenig vom Hals abgesetzt;	Kopf deutlich vom Hals abgesetzt;
Der Habitus macht einen schlanken Eindruck;	Der Habitus macht, wenigstens bei dem ad. ♀, einen plumpen Eindruck;
Kopf schmal und ziemlich lang;	Kopf ziemlich breit und dreieckig;
Vertebrale Flecken oval;	Vertebrale Flecken rund;
Laterale Fleckenreihe klein, teilweise aufgelöst und weniger deutlich;	Laterale Fleckenreihe gross, deutlich abgegrenzt und nicht aufgelöst;
Dorsolaterale und marginale Flekkenreihe klein;	Dorsolaterale und marginale Flekkenreihe merklich grösser und deutlicher;
Kopfzeichnung reduziert;	Kopfzeichnung nicht reduziert;
Occipitalflecke und Interocularfleck schmal und undeutlich;	Occipitalflecke und Interocularfleck breit und scharf von der Grundfarbe abgegrenzt;
Subocularfleck fehlt.	Subocularfleck deutlich vorhanden.

Die Verschiedenheid in Schuppen und Schildern scheint innerhalb der normalen Variationsbreite zu liegen und wurde hier vorläufig nicht weiter besprochen. Erst ein grösseres Material von Java und den Kleinen Sunda-Inseln wird zeigen können, wie diese Unterschiede zwischen *V.r. limitis* von Flores und *Vipera russellii* von Java zu bewerten sind. Zweifellos bestehen zwischen den javanischen *russellii* und der Nominatform reichlich viel Unterschiede, um eine eigene Rasse zu unterscheiden. Die Frage ist aber, ob die javanischen *russellii* mit *V.r. limitis* Mertens identisch sind, oder als eigene Rasse abgetrennt werden müssen, für welche ich dann den Namen ***Vipera russellii sublimitis*** vorschlagen möchte.

Die 3 von Java bekannten *Vipera russellii* wurden in der Umgebung des Ortes Sepandjang, einige Kilometer südlich von Soerabaja gefangen, beinahe an der Grenze dieser grössten Stadt von Java. Der Inländer, der die 2 letzten Schlangen brachte, gab an, diese Art zu kennen und nannte sie b a n d o t a n - p o e s p o (bandotan = Landschaft; poespo = Blume).

Es hat den Anschein, dass *Vipera russellii* auf Java tatsächlich auf den östlichen Teil der Insel beschränkt ist. Dass sie aber gerade an der Grenze einer Stadt mit 340.000 Einwohnern, in der sehr dicht bevölkerten, Küstenebene lebt, ist aussergewöhnlich merkwürdig. Ueber ihr Freileben in Java ist bisher nichts bekannt. NEUHAUS (1) gibt an, dass sein erstes Exemplar in einer trockenen Landschaft, nahe einem Wassergraben und bei ausgestreckten Bambusbüschen gefangen wurde. DUNN (4) fand seine beiden *russellii* in Komodo auf den niedrigen Hügeln der Insel, während MERTENS (3) von Endeh, woher er seine *V.r. limitis* erhielt, berichtet, dass diese kleine Insel sehr trocken sei. Komodo gehört, wie wir wissen, ebenfalls zu den trockenen Gebieten des Indo-Australischen Archipels, so dass *V. russellii* hier scheinbar eine trockene Landschaft als Wohnort benötigt. Hiermit ist vielleicht auch ihr [sehr wahrscheinliches] Fehlen in dem feuchten West- und Mitteljava erklärt.

Alle 6 bisher vom Indo-Australischen Archipel beschriebenen *V. russellii* wurden im Tief- resp. niederen Hügelland angetroffen. In Südindien aber reicht *V. russellii* bis in ± 2300 m Höhe hinauf.

Von meinen beiden Exemplaren beobachtete ich das ♂ ½ Jahr und das ♀ 1½ Jahre lang in der Gefangenschaft, so dass ich nun einige biologische Beobachtungen mitteilen kann. Wenn MELL sagt, dass *V. russellii* von allen asiatischen Schlangen am lautesten zischt, so kann ich ihm hierin völlig beistimmen. Sicherlich zischt sie von allen javanischen Schlangen am lautesten und längsten. Ich kenne überhaupt keine Schlange, welche neben ihrem abschreckenden Aeusseren auch noch durch ihre Stimme einen so bedrohlichen Eindruck macht. Bei jeder Störung, sei es durch einen Menschen oder durch eine in den Käfig gesetzte Ratte, liess sie ein wütendes Zischen hören, das ganz besonders durch seine lange Dauer erschreckend wirkte. Das Zischen erfolgt nicht stossweise wie bei den meisten Schlange, sondern dauert an, als ob Dampf unter Druck seinen Weg ins Freie findet. Mir ist keine andere Schlange bekannt, die den Menschen durch ihre "Stimme" so beängstigen kann. Dass sie beim Zischen Gifttröpfchen fortschleudert, wie mehrfach mitgeteilt wird, kann ich vorläufig nicht bestätigen. Trotz genauer Beachtung waren niemals Tröpfchen wahrnehmbar, auch wenn die Schlange noch so laut und heftig zischte. Merkwürdig war auch, dass sie nur selten biss und es meist beim Zischen liess. Ganz allgemein erwiesen sie sich als ruhige, träge, aber sehr reizbare Tiere.

In Britisch-Indien zählt man *V. russellii* zu den gefährlichsten Giftschlangen und soll ihr Biss oftmals tötlich verlaufen. Ja, sie soll sogar die meisten Bisse mit tötlichem Ausgange auf ihrer Rechnung haben. Von Java ist bisher kein einziger Unfall bekannt. Andrerseits soll sie aber in Indien ihre Anwesenheit oft durch lautes Zischen verraten, was man sicherlich 15 m weit deutlich hört.

Sowie die meisten Schlangen tat sie Tieren, welche sie nicht fressen wollte nichts. Ratten und Vögel waren oft 1-2 Wochen lang in ihrem Käfig, wurden von Zeit zu Zeit heftig angezischt, wenn sie zu unruhig waren, aber nur dann gebissen, wenn die Schlange fressen wollte. Nur 2 mal in 1½ Jahren tötete sie eine Ratte, ohne sie zu verschlingen.

Ihre Nahrung bestand ausschliesslich aus kleinen Vögeln und Ratten. Manchmal nahm sie auch tote Tiere zu sich. Schlangen, Eidechsen und Frösche weigerte sie stets. Mein *russellii* ♀ frass bloss tagsüber. Niemals nahm sie nach Sonnenuntergang oder vor Sonnenaufgang Nahrung an. Vornehmlich frass sie zwischen 11 Uhr vormittags und 5 Uhr nachmittags. Hatte sie einen Reisvogel erfasst, so hielt sie ihn mit den Zähnen fesst, bis er keine Bewegung mehr machte, was selten länger als 20 bis 30 Sekunden dauerte. Meist zeigte der Vogel schon nach wenigen Flügelschlagen Lähmungserscheinungen. Sobald der Tod eingetreten war, liess sie das Tier los, betastete es von allen Seiten (was manchmal einige Minuten dauerte), erfasste es dann beim Kopf und verschlang es langsam. Umschlungen wurde die Beute niemals. Grosse Ratten hielt sie nach dem Biss nicht fest, sondern folgte ihnen bis sie verendet waren. Wahrscheinlich reichte ihre Kraft nicht aus, eine erwachsene Ratte festzuhalten. Halbwüchsige Ratten wurden als Nahrung zweifellos vorgezogen. Nestratten, die Lieblingsnahrung von *Naja naja*, wurden nicht gerne gefressen.

Um einen Eindruck von der Nahrungsmenge zu geben, sei mitgeteilt, was das 98 cm lange ♀ in 1 Jahre zu sich nahm:

23. VI.	1934.	1	*Munia maja*
25. VI.	—	1	junge *Rattus rattus roquei*
1. VII.	—	1	*Padda oryzivora*
8. VII.	—	1	„ „
10. VII.	—	1	„ „
14. VII.	—	3	junge *Rattus rattus diardi*
18. VII.	—	1	*Padda oryzivora*
19. VII.	—	2	„ „
25. VII.	—	1	„ „
30. VII.	—	1	„ „
3. VIII.	—	2	„ „
7. VIII.	—	1*	„ „
11. VIII.	—	1	„ „
20. VIII.	—	1	„ „
28. VIII.	—	1	„ „
17. IX.	—	1	„ „
19. IX.	—	1	„ „
21. IX.	—	1	*Munia ferruginosa*
23. IX.	—	1	„ „
24. IX.	1934.	2	*Munia ferruginosa*
3. X.	—	1	junge, weisse Ratte
6. X.	—	1	*Mus musculus*
12. X.	—	1	junge *Rattus rattus diardi*
18. X.	—	1	*Munia maja*
20. X.	—	1	junge *Rattus rattus diardi*
27. X.	—	1	erwachsene weisse Ratte
27. X.	—	5	Nestratten (*R. r. diardi*)
30. XI.	—	1	junge weisse Ratte
1. XII.	—	1	„ „ „
8. XII.	—	1	grosse weisse Ratte
14. XII.	—	1	junge weisse Ratte
17. XII.	—	1	„ „ „
23. XII.	—	1	*Munia maja*
25. XII.	—	1	erwachsene weisse Ratte

31. XII.	1934.	1 erwachsene weisse Ratte	6. IV.	1935.	3 junge weisse Ratten
28. II.	1935.	1 grosse weisse Ratte	12. IV.	—	1 „
7. III.	—	1 „	30. IV.	—	3 „
20. III.	—	2 junge weisse Ratten	14. V.	—	3 „
1. IV.	—	2 „	24. V.	—	6 Nestratten (*R. r. diardi*).
3. IV.	—	1 „			

Zusammenfassend bestand die Nahrung in 1 Jahre aus 17 *Padda oryzivora*, 3 *Munia maja*, 4 *Munia ferruginosa*, 1 *Rattus rattus roquei*, 5 jungen *Rattus rattus diardi* und 11 Nestratten derselben Art, 1 *Mus musculus*, 20 halbwüchsigen und 6 erwachsenen weissen Ratten, total also aus 43 Ratten, 1 Maus und 24 Vögeln. Davon wurden 12 Vögel und 7 Ratten tot angenommen. *Rattus*, *Padda* und *Munia* starben 20-60 Sekunden nach dem Biss.

Die Verdauung arbeitet bei dieser Schlange rasch. Erwachsene Ratten wurden in 5-12 Tagen völlig verdaut. Während der Verdauung verliess die Schlange ihr Versteck nie, eine Beobachtung die man bei den meisten Schlangen macht und was die Ursache dafür ist, dass man in der freien Natur relativ selten Schlangen findet, die einen [noch wenig verdauten] Mageninhalt haben. Während der Gefangenschaft häutete sich das ♀ am 11 April, 25. Juni, 16. September und 1. Dezember 1934, ferner am 26. Februar, 9. Juni und 5. September 1935; in einem Jahre also 5 mal. Die Haut wurde stets in einem einzigen Stück abgestreift.

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XIV. Ueber die Jugendform von *Dendrelaphis pictus inornatus* Blgr.

Eine kleine Schlangenkollektion, welche Mrs. WALSH im Jahre 1929 von Timor mitbrachte und dem Zoologischen Museum in Buitenzorg überliess, enthielt 3 Exemplaren der bisher noch nicht beschriebenen Jugendform von *Dendrelaphis pictus inornatus* BLGR. Das Merkwürdige an dieser Jugendform ist, dass sie quer über den Hals etwa 8 schräg nach rückwärts verlaufende schwarze Querbänder besitzt, etwa wie bei *striata* von Sumatra, aber wesentlich weniger deutlich. Aehnliche, aber senkrecht gestellte Querbänder sind auf dem Halse bei ganz jungen Stücken von *Dendrelaphis pictus pictus* von Java vorhanden,

reichen hier aber nicht quer über den Rücken wie bei *inornatus*, sondern sind auf die Halsseiten beschränkt. Bei den 3 ganz jungen *D.p. inornatus* von Timor sind die Supralabialia hell gelb und befindet sich in ihrer Verlängerung auf dem Halse eine helle Seitenlinie angedeutet. Auch bei 1 von den 4 ad. *inornatus* derselben Sammlung verläuft entlang der äussersten Schuppenreihe eine wenig deutliche, helle Linie.

Wie ein noch sehr jugendliches Stück dieser Sammlung demonstriert, und wie mir ebenfalls von *D. pictus pictus* bekannt ist, verschwindet diese Halszeichnung im Laufe des Wachstums sehr rasch und ist eigentlich bloss in den allerersten Jugendstadien deutlich vorhanden. Die Untersuchung der Jugendformen der anderen Unterarten von *Dendrelaphis pictus* wird über die Frage Aufschluss geben müssen, ob diese Quer-, resp. Schrägstreifen als Rudimente einer quergestreiften Stammform aufzufassen sind.

XV. Ueber *Bungarus javanicus* Kopst.

Seit der Typenbeschreibung in Treubia, Vol. XIV, 1932, p. 73 glückte es mir, noch 2 Exemplare dieser seltenen Schlange aus der Umgebung des typischen Fundortes zu erhalten. Eines davon stimmt in allen Punkten vollkommen mit der Type überein, während das 2. in seinem Zeichnungsbilde stark divergiert.

I. — 1 ad. ♀; Cheribon, Westjava, Nordküste; XII. 1932.

Sq. 15-15-15; V. 212 + 1; Sc. 46 + 1; totale Länge 827 mm; Schwanz 117 mm.

Bis auf einige kleine, unten angeführte Verschiedenheiten stimmt dieses Exemplar völlig mit der Type überein. Die vergrösserten Vertebralschuppen beginnen ebenfalls eine Kopflänge hinter den Parietalen, sind aber durchwegs länger als breit. Das 1. Ventrale ist vom 2. Kinnschildpaar durch einige Kehlschuppen getrennt. Der Rücken ist hier deutlich kantig und der Körper seitlich zusammengedrückt. Der runde Rumpfdurchschnitt der Type ist vielleicht die Folge einer intensiven Beschädigung (Tritte) beim Töten.

Die bei der Type deutlich vorhandenen dunklen Flecken seitlich auf den Ventralschildern sind hier bloss angedeutet.

Dieses ♀ wurde im Garten des Hospitals von Cheribon, an der Grenze der Stadt, ± 20 km nordöstlich von der Fundstelle der Type gefangen.

II. — 1 ad. ♂; Linggadjati bei Cheribon, Westjava; ± 500 m; leg. Dr. L. VAN DER PIJL; III. 1935.

Sq. 15-15-15; V. 209 + 1; Sc. 49 + 1; totale Länge 1085 mm; Schwanz 143 mm.

Frontale kürzer als sein Abstand vom Rostrale. Zwischen dem 1. Ventrale und dem 2. Kinnschildpaar einige Kehlschuppen. Die stark vergrösserten Vertebralschuppen beginnen 1½ Kopflängen hinter den Parietalen. Sie sind beinahe 3 mal so breit als die angrenzenden Schuppen und von Beginn an deutlich breiter als lang. Die letzte Schuppenreihe ist bloss wenig breiter als die neben den Vertebralschuppen gelegene Reihe. Der Rücken erscheint weniger kantig als bei dem vorhergehenden ♀. Körper weniger seitlich zusammengedrückt.

In der Zeichnung besteht ein auffallender Unterschied zwischen dem ♂ und den beiden ♀♀ von Matanghadji und Cheribon. Es sind nämlich auf dem vorderen Teile des Rumpfes 11 schwarze Querbänder angedeutet. Sonst entspricht die Zeichnung und Färbung der Typenbeschreibung, nur dass die Verteilung der lichten und dunklen Elemente auf den Vertebralschuppen etwas anders ist. Bei dem ♂ aus Linggadjati sind die mittleren Partien hell und die seitlichen Ränder dunkel, bis auf das Rumpfende, wo ebenfalls ein heller Rand die sonst dunklen Schuppen umrahmt.

Die Unterseite entspricht der Typenbeschreibung, war aber im Leben nicht curcuma-gelb, sondern weisslich.

Wie dieses ♂ aufgefasst werden muss, ist vorläufig unklar. Jedenfalls deutet die Zeichnung auf einen stammesgeschichtlichen Zusammenhang mit *Bungarus candidus*. Möglicherweise handelt es sich überhaupt um eine Mutation. Auch spricht nichts gegen die eventuelle Annahme, dass es durch Verbastardierung entstanden ist. Unter Hunderten von *Bungarus candidus*, welche ich auf Java gesehen habe, zeigte keine einzige auch nur annähernd so weitgehende Variation in Bezug auf Zeichnung und Färbung. Ausnahmslos bestand das Zeichnungsbild aus dem gewöhnlichen Wechsel von dunklen und hellen Querbändern, wobei die Verschiedenheiten bloss in der verhältnismässigen Breite der Bänder zu einander und der variablen, wenig auffallenden Fleckung der hellen Zwischenräume gelegen sind.

Dieses ♂ wurde abends, am Rande eines Kanales gefangen, wo es langsam herumkroch und gar nicht auf die sich mit Lichtern nähernden Menschen reagierte. Linggadjati liegt am Fuss des Berges Tjareme (Tjerimai), 500 m hoch, ± 20 km südlich von Cheribon. Alle 3 bisher bekannten Exemplare wurden in einem Umkreise von ± 20 km, von der Küste bis in 500 m absolute Höhe angetroffen.



F. KOPSTEIN: Herpetologische Notizen XIII. *Vipera russellii*; ad. ♀ von Java.

ON SOME EXAMPLES OF THE GENUS *LEPTOGOMPHUS* *(Odon., Gomphidae).*

By

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I have to thank Mr. M. A. Lieftinck for the opportunity of studying the interesting pair of Gomphines from Borneo, discussed in the following note, and also for letting me compare with them an example of the same genus from Basilan in the Philippine group. In addition he has very kindly sent me the drawings of the anal appendages and genitalia of the males which accompany the note. These serve to make the verbal description much easier to follow.

All specimens are in the collection of the Buitenzorg Museum.

Leptogomphus coomansi sp. n. (Text-fig. 1).

1 ♂ (Holotype). W. Borneo. Near Singkawang, "Forest-patches between Pakmiongtheo and Pandjaoa". 3. IV. 1932, leg. L. Coomans de Ruiter.

Length of abdomen 35 mm.

of hindwing 30 mm.

Nodal indicator $\frac{13-16 \quad 19-12}{11-11 \quad 13-11}$.

Anal triangle three-celled. Basal postcostal present on all wings. Pterostigma unbraced. Maximum of two rows of cells in anal area of fore wing.

Head: Upper lip yellow, broadly margined with black, the yellow finely indented in front. Anteclypeus black, postclypeus yellow. Genae yellowish brown. Frons yellow, vertex and occiput black.



Text-fig. 1. — *Leptogomphus coomansi*, sp. n. Anal appendages of male, seen from above and from the right side, and genitalia of second segment of the abdomen, from the left side (holotype).

Prothorax: black, with a pair of yellow spots lying transversely on the middle lobe.

Synthorax: black, mesothoracic collar yellow narrowly interrupted in the middle line. A pair of narrow, dorsal stripes of the same colour continuous

with the collar. Sides dark gray passing to yellow posteriorly, with broad black bands along the sutures. Legs black, coxae marked with yellow.

Abdomen: almost entirely black; sides of the first segment and the oreillettes yellow, the latter narrowly edged with black. A terminal, yellow spot apically on the sides of the second segment, and dorsal marks of the same colour on the first and second segments, that on the second consisting of a narrow, longitudinal line.

On the dorsum of the tenth segment there are a pair of mamma-like tuberosities, which are studded with irregularly arranged, thorn-like spines.

Anal appendages: Upper pair distant, rather slender, acuminate apically. Viewed laterally, the lower border is rather regularly serrate as far as the up-curving base of the terminal spine. Lower appendage, of about the same length as the upper pair, with widely separated, parallel branches, between which its posterior border is regularly curved. The appendages are of approximately the same length as the tenth segment of the abdomen.

1 ♀ (Allotype). W. Borneo. Singkawang, "Forest-stream Soengei Bagak" 10. VI. 1933, leg. L. COOMANS DE RUITER.

Length of abdomen 37.5 mm.

of hindwing 32.5 mm.

Nodal indicator $\frac{11-15 \quad 15-11}{10-11 \quad 11-12}$.

Basal postcostal absent on both hindwings.

Head: As in male.

Prothorax: Yellow markings more extensive than in the male, the middle lobe is largely yellow, and there are yellow marks on either side anteriorly.

Synthorax: As in the male, the sides are however more obscurely coloured with a dark gray-brown, but the metepimerite is yellow.

Abdomen: The yellow markings on the sides of the first and second segments are more extensive than in the male, whilst there seems to be no mark on the dorsum of the second segment, and the rest of the abdomen, which is decidedly slender, is entirely black.

I have much pleasure in naming this new form for its collector, Mijnheer COOMANS DE RUITER, who has already made considerable additions to the Bornean dragonfly fauna. I understand from my friend M. A. LIEFTINCK that quite a large number of new and unrecorded species are awaiting entry on the list, and that a large proportion of these have fallen to the net of the same collector.

The present species is evidently not remotely related to *lansbergei* SELYS and *assimilis* KRÜGER, from Java and Sumatra respectively. (Cf. RIS. 1927. Zoöl. Mededeel. Leiden. X, pp. 28 - 29, figs. 15 - 18).

It differs from them in that in both sexes there is no antehumeral (outer) dorsal stripe on the dorsum of the synthorax, whilst the dorsal stripe meets the mesothoracic collar.

The males are distinguishable by the fact that the upper anal appendages in the case of *coomansi* have the dorsum black, whilst the Sumatran and Javanese species have these structures coloured white above.

But it is evident that the three forms are so allied that they may be taken as representative species, or to use a term which is now coming into fashion, they belong to a "Formenkreis".

There are of course plenty of other cases amongst the dragonflies of these Islands in which we meet with a similar state of affairs. And at present it is largely a matter of individual preference as to whether one uses a trinomial nomenclature for such cases, or whether one gives only the single specific name. I have here, purely as a matter of my own preference, kept to the more conservative method of the single specific name.

Leptogomphus sp. (? semperi SELYS). (Text-fig. 2).

1 ♂. Philippine Is. Basilan Is. Maloong. 21. VIII. 1932, leg. K. KUWASIMA. (The specimen is much broken, and very dry).

Length of abdomen 35 mm. circ.

of hindwing 30 mm.

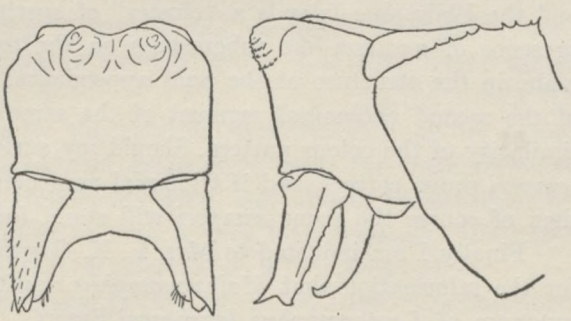
Nodal indicator $\frac{11-17 \quad 18-10}{11-11 \quad 11-11}$.

Anal triangle three-celled. Basal postcostal present on all wings. Pterostigma unbraced. Maximum of two rows of cells in anal area of forewing.

Head: Upper lip black, with a pair of square yellow spots. Horizontal part of frons yellow, the rest of the head, except the yellowish green genae, black.

Prothorax: black with a pair of transverse yellow marks on the middle lobe.

Synthorax: black, mesothoracic collar yellow, interrupted in the middle line. A narrow pair of dorsal stripes of the same colour do not meet the collar. Antehumeral stripes present, but very slender. Sides of thorax brown, broadly marked with black bands along the position of the sutures.



Text-fig. 2. — *Leptogomphus* sp (*? semperi*). Anal appendages of male seen from above and from the right side.

Legs: (discoloured) black, coxae and infraepisternites brown.

Abdomen: (discoloured, and incomplete) almost entirely brown black with indications of brown markings on the sides of the first and second segments.

Anal appendages: much as in *coomansi*, but the last serration of the lower margin of the upper appendages is produced so as to form a terminal spine which gives the appendage a bifid appearance when looked at laterally.

It should be noted also that the mamma-like processes of the dorsum of the tenth abdominal segment have their spines more regularly arranged, in concentric rings (see fig. 2).

Here again we have a species evidently belonging to the same "cluster" as *coomansi, lansbergei* and *assimilis*, but differing sufficiently to deserve recognition as a representative species. It remains to be settled whether or no this form has already been named.

At present one species only of *Leptogomphus* has been recorded from the Philippines, *viz. semperi* SELYS (SELYS 1878. Bull. Acad. Belg. (2) XLVI. p. 442). Unfortunately his account is not very full, and I regret that I have not been able to find an opportunity of studying his types in the Brussels Museum. In his well known paper on the "Dragonflies of Burma and Lower Siam" WILLIAMSON figures the venation of *semperi* from "Borneo". (WILLIAMSON 1907. Proc. U.S. Nat. Mus. XXXIII. p. 292). It is not made clear in the text whether he had actually seen the specimen, but I think one may infer that the photo was one sent to him from Brussels by M. SEVERIN (See WILLIAMSON's introductory remarks). In this case the photo would most likely be that of the type male. It may have been taken from a specimen in the type series, from Borneo, but I am inclined to think that the locality "Borneo" is a mistake, and that possibly WILLIAMSON was misled by MARTIN who gives Tonkin and Borneo as localities for the species in addition to the Philippines (MARTIN 1904. Mission Pavie, Indo-Chine, 3, p. 215).

On the whole I believe that the evidence points strongly to this specimen being an example of *semperi*, but as some doubt exists on the point I prefer to leave the question open.

But there can be no doubt that there exists in Sumatra, in Java, Borneo and the Philippine Islands a "cluster" of species all allied in venation, in the presence of mamma-like tuberosities on the tenth abdominal segment of the male, in the structure of the anal appendages, and of the genital appendages of the second abdominal segment of the same sex; as well as in the general similarity of the colour pattern. Should my surmise that this specimen is really *semperi* prove correct, and if trinomial nomenclature be adopted for the group, then of course the name *semperi* will stand for that of the "Formenkreis".

Finally I am indebted to Mrs. L. K. GLOYD of the University of Michigan for the information that *Malayogomphus semiteres* FÖRSTER is undoubtedly a synonym of *Leptogomphus lansbergei* SELYS.

STUDIES IN ORIENTAL *MECOPTERA*.

I. The genus *Leptopanorpa* in Malaysia.

By

M. A. LIEFTINCK

(Zoölogisch Museum, Buitenzorg).

For some time I have been studying the *Mecoptera* of Malaysia and some of the neighbouring parts of the Oriental Region, partly to enable me to identify my own captures during the last five years in Java, and partly for the purpose of revising the Buitenzorg Museum collection in this group. The notes gathered while engaged on this task seem to be worth recording.

The present revision deals only with *Leptopanorpa*, a genus of which our knowledge was very unsatisfactory and more and carefully collected material was required in order to place the known species on a firmer and more modern taxonomic basis.

History.

The history of the genus in the existing literature is briefly characterized as follows:

Leptopanorpa was founded by R. McLachlan, on page 187 of the Transactions of the Entomological Society of London for the year 1875. The original diagnosis runs as follows:

> "Differs from *Panorpa* by the extreme slenderness of all its parts; the wings very narrow; the rostrum exceedingly long; the three terminal segments of the ♂ abdomen immensely long, and almost thread-like, the cheliferous segment being provided with a very long footstalk; the basal (unmodified) segments long (not transverse as in *Panorpa*) [1]).

The genotype, *L. ritsemae* McLachlan (loc. cit. p. 187 - 188) was described from one male and one female, collected by von Siebold in Japan. Both specimens are in the collection of the Leiden Museum. A second species, *L. sieboldi*, also from Japan, was described by the same author, but the male of this remained unknown.

In the "Mecoptera and Planipennia of Insulinde" (Notes Leyden Museum, 31, 1909) van der Weele quotes part of the original description and describes one new species from Java, viz. *L. longicauda* v. d. Weele. For the reception of the

[1]) See p. 273, footnote.

Malaysian species of the old genus *Panorpa*, that author proposes the new subgeneric name *Neopanorpa*, in which the following species would be placed:

N. angustipennis (WESTWOOD).

N. mülleri v.d. WEELE, and its subspecies *ungaranensis* v.d. WEELE.

N. javanica (WESTWOOD).

N. pi v.d. WEELE.

N. nematogaster (MCLACHLAN).

N. jacobsoni v.d. WEELE,

while *Panorpa charpentieri* BURM. is doubtfully placed.

The males of the species of *Neopanorpa* are here differentiated from *Panorpa* "by the curious process of the hindborder of the third tergit, which bears a very variable clubshaped prominency, that rests upon an elevation of the fourth tergit and which does not exist in the European species. I would propose for this group, that overleads to *Leptopanorpa*, the subgeneric name of *Neopanorpa*". (Loc. cit., p. 4). Other differences between *Panorpa* and *Neopanorpa*, and between *Neopanorpa* and *Leptopanorpa* are not given.

At the present time we know that all the species enumerated above, with the exception of *angustipennis* and its near ally *mülleri*, should be placed in the genus *Leptopanorpa* (*postea*).

ENDERLEIN, in the Zool. Anzeiger, 35, 1910, p. 392, has erected the generic name *Himanturella*, with *tubifera* ENDERLEIN as genotype, but since *tubifera* END. 1910 is the same species as *longicauda* WEELE 1909, which is a true *Leptopanorpa*, ENDERLEIN's unfortunate selection is invalidated. Moreover, ENDERLEIN created a second invalid name in making *Panorpa javanica* WESTWOOD the type of his new genus *Campodotecnum*, a species belonging undoubtedly to *Leptopanorpa*. In 1912, ENDERLEIN adds further to the confusion in placing his *Himanturella* as a synonym of *Neopanorpa*, while *nematogaster* is erroneously fixed as the type of *Himanturella* END. Thus, as has clearly been ascertained by ESBEN PETERSEN in his "Synonymic List of the order Mecoptera" (Entom. Meddelelser, 10, 1915), *Neopanorpa* WEELE 1909 (type: *P. angustipennis* WESTWOOD) is of earlier date than *Campodotecnum* ENDERLEIN 1910, and should be used as the name of that genus, while *Himanturella* becomes an absolute synonym of *Leptopanorpa* MCLACHLAN 1875, of which *ritsemae* is the type.

ENDERLEIN, on page 393 of his paper in the "Zoologischer Anzeiger" differentiates *Leptopanorpa* from his new genus *Himanturella* by the following characters:—

> "Diese Gattung unterscheidet sich von *Himanturella* ENDERL. durch das langgestreckte (nicht quergestellt und kurz) erste Abdominaltergit, das es zugleich von allen übrigen Gattungen der Unterfamilie *Panorpinae* auszeichnet. 6., 7. und 8. Segment sehr lang, fadenförmig. 9. Segment des Männchens gestielt. In diese Gattung gehört noch die *L. sieboldi* MACLACHL. 1875 gleichfalls aus Japan.
>
> MACLACHLAN schliesst ausdrücklich den *P. nematogaster* MACLACHL. aus Java von dieser Gattung aus".

Here ENDERLEIN is again wrong, as has been pointed out by ESBEN PETERSEN (Notes Leyden Mus. 35, 1913), who writes as follows:—

> "When MACLACHLAN (Trans. Ent. Soc. Lond. Vol. II, 1875) states that the 1st abdominal segment in *Leptopanorpa* is very long, contrary to what takes place in all other genera of the *Panorpidae*, this statement is due to a misunderstanding. I saw the type specimen (♂) of *L. ritsemae* in the Museum of Leyden, July 1912, and later on Conservator R. VAN EECKE, Leyden, kindly has examined the type specimen and made a sketch of its abdomen for me, so I am sure that the genus does not differ from the other Panorpid-genera in this respect". (Loc. cit. p. 225, footnote) [1]).

On page 2 of ESBEN PETERSEN's monographic revision of the order *Mecoptera* (Cat. Coll. SELYS, fasc. V, 2nd part, 1921), the genera *Neopanorpa* and *Leptopanorpa* are distinguished thus:

"3. Abdomen in the male as long as the wings or shorter; 7th and 8th segments only a little prolongated *Neopanorpa.*
Abdomen in the male much longer than the wings; 7th and 8th and sometimes also 9th segment much prolongated *Leptopanorpa.*

Anticipating a thorough investigation of the generic and specific characters of *Neopanorpa*, it is sufficient for the present purpose to state that there are several reasons for thinking that the two genera, though closely related, are not differentiated on these characters alone, at least not in the male sex. Following ESBEN PETERSEN, the name *Leptopanorpa* is retained in this paper for a number of discontinuously distributed species, which are chiefly characterized by the slenderness of their body and wings. A discussion of the interrelationship of these two genera is better postponed until a study of the genital characters of Malaysian *Neopanorpa*, and of the extra-regional species of *Leptopanorpa*, is completed.

The unsettled condition of taxonomy within the genus *Leptopanorpa* is largely responsible for the uncertainty of nomenclature of several Malaysian species.

ESBEN PETERSEN (loc. cit. 1915, p. 230 - 231, and 1921, p. 85 ff.) enumerates 10 species of *Leptopanorpa*, viz.:

[1]) Dr. H. C. BLÖTE, whom I asked to verify PETERSEN's statement, in a letter dated January 31th, 1936, writes me the following: — "*Leptopanorpa ritsemae* is represented in our collection by the unique male. Although still in fairly good condition, the specimen has been mouldy, the abdomen being rather shrivelled. The structure of the abdomen does not differ from that of the type of *L. longicauda* V. D. WEELE, with which I have compared it. The 9th segment is slightly longer, and the 7th and 8th segments are each a little shorter than in that species. The rudiment of the first abdominal segment is scarcely visible in the type ♂ of *ritsemae*, but in the ♀ it is more distinct (the body-pattern as well as the colours are rather different in the two sexes of this species, but I can not judge whether they might belong to two different species). The females of *L. sieboldi* are in very bad condition; the basal abdominal segment is unrecognizable". — From this renewed investigation it is evident that ENDERLEIN's generic name *Himanturella* should be withdrawn.

L. charpentieri (BURM.)	Bengal, Sumatra, Java.
L. effusa (NAVÀS)	Sikkim.
L. furcata (HARDWICKE)	Nepal.
L. jacobsoni (V.D. WEELE)	Java.
L. javanica (WESTWOOD)	Burma, Hainan, Sumatra, Java.
L. longicauda (V.D. WEELE)	Java.
L. pi (V.D. WEELE)	Java.
L. ritsemae MCLACHLAN	Japan (genotype).
L. sieboldi MCLACHLAN	Japan.
L. tubifera (ENDERLEIN)	Java.

Of these, I have not seen *L. ritsemae, sieboldi, furcata* and *effusa*, while Sumatran specimens of *charpentieri* (= *nematogaster* nob.) and *javanica* are also unknown to me.

In the present revision 6 new species and 1 new subspecies are described; *L. charpentieri* is traced specifically distinct from *nematogaster*, and a re-examination of most of the other species has resulted in the following revised list:

L. charpentieri (BURM.)	Bengal.
L. effusa (NAVÀS)	Sikkim.
L. erythrura, sp.n.	Java.
L. filicauda, sp.n. (= *longicauda* WEELE et PETERSEN, *partim*)	Java.
L. furcata (HARDWICKE)	Nepal.
L. inconspicua, sp.n.	Java.
L. jacobsoni (V.D. WEELE)	Java.
L. javanica (WESTWOOD)	Burma? Hainan? Sumatra? Java.
L. longicauda (V.D. WEELE) (= *tubifera* END. et auct., *partim*)	Java.
L. nematogaster (MCLACHLAN) (= *charpentieri* PETERSEN et auct., *partim*, *nec* BURMEISTER) (= *? linguata* NAVÀS)	Sumatra ? Java.
L. peterseni, sp.n. (= *pi* PETERSEN *partim*, *nec* V.D. WEELE)	Java.
L. pi pi (V.D. WEELE)	Java.
L. pi decorata, subsp.n.	Java.
L. ritsemae MCLACHLAN	Japan (genotype).
L. robusta, sp.n.	Java.
L. sarangana, sp.n.	Java.
L. sieboldi MCLACHLAN	Japan.

There are still two species of *Campodotecnum* described by ENDERLEIN (Notes Leyden Mus. 34, 1912, p. 236 - 237), which need elucidation. These are *C. lemniscatum* END. (Mt. Oengaran, Mid Java, ♀ only), and *C. cingulatum* END. (Mt. Panggerango, West Java, ♀ only). The former is almost certainly a *Neopanorpa*, and the latter may or may not be identical with my *L. erythrura*, but since of both species the males are unknown, the descriptions moreover

being quite insufficient, it is even impossible to ascertain the generic position of these two species. The types, to which I had no access, are in the Leiden Museum.

CHARACTERS.

The chief characteristics which have been used in the classification of Oriental *Panorpidae* are the wing-markings and the general aspect and size of the male abdominal segments.

As has been shown by CARPENTER [1]) for the nearctic species of *Panorpa,* and by MIYAKÉ and ISSIKI [2]) for the Japanese and East Asian *Panorpidae* (including some of the continental forms of *Neopanorpa*) these secondary characters are greatly variable and of but little value in safely discriminating the numerous species. After an examination of several hundreds of specimens of *Leptopanorpa* and *Neopanorpa* from Sumatra and Java, I soon became convinced that the systematic value of colours, wing-markings and external peculiarities of the body had been greatly exaggerated by previous and even recent writers. The normal range of variation in the wing-markings and the proportionate length of abdomen and wings is only determined by a careful survey of the amount and nature of variability in long series of each species. This amount of variability is different in almost every species. Colour and markings of the wing are convenient features for a general classification and sifting of the groups, and are sometimes even so constant that we can use them to assist in the determination of the species, provided that the doubtful cases are checked by the genitalia; taken alone they never furnish us with a means of accurate and final identification. The colour of the body is a notoriously bad guide to species in this family, although there appear to be certain well defined l i m i t s o f v a r i a t i o n. Some species, as e.g. *L. nematogaster,* have no definite pattern and show a great diversity of coloration, exhibiting nearly the whole gamut of colours from yellow through testaceous, ferruginous, brown and black, according to age and maturity. In others, such as *L. longicauda, filicauda, erythrura, sarangana,* the body-p a t t e r n is very distinct and quite stable, the apparent variation being caused by the change of colour-i n t e n s i t y. As was first stated by CARPENTER, the colour of the body of the dried *Panorpa* depends upon a number of external factors, viz., the extent of time since the insect emerged from the pupa, and the amount of grease in the body of the insect, which soon after death causes a complete change of colours. For the preservation of colours rapid drying is therefore essential.

Encouraged by the excellent studies of CRAMPTON, and especially ISSIKI, on scorpion-flies of North America and Japan, a careful study of the genitalia

[1]) See: p. 286, footnote.

[2]) T. MIYAKÉ: Studies on the Mecoptera of Japan. Journ. Coll. Agric. Tokyo, 4, 1913, p. 265 - 400, 10 pls.

S. ISSIKI: Morphological Studies on the Panorpidae of Japan and Adjoining Countries and Comparison with American and European Forms. Jap. Journ. Zool. Tokyo, 4, 1933, p. 315 - 416, 45 figs.

of *Leptopanorpa* was begun and it was soon evident that the genital structures of both sexes afford very important specific characters. In long series of one species it was found that even the minutest details of the male and female genitalia remain perfectly stable and easily comprehensible. The structure of these organs has been discussed by MIYAKÉ, CRAMPTON [1]), CARPENTER and others. Recently, a very detailed account of the genitalia throughout the entire family (except *Leptopanorpa*!) has been published by ISSIKI, who added excellent drawings of structural details. In this paper I have followed the terminology used by ISSIKI, so that it is only necessary to note the various parts most useful in taxonomy.

The wings. — The wings of *Leptopanorpa*, though generally narrower and more pointed than in *Neopanorpa*, are not venationally different from that genus. The anal veins are short and reduced, and in none of the Malaysian species a third anal vein is preserved in the hind wing. The venation is simple and the position and length of the various branches and cross-veinlets varies much in long series of each species. The shape of the wings is fairly constant, though unreliable as a specific means of distinction. In the majority of the species the wings are spotted and banded with brown; these wing-markings are very variable, better developed in the front wings than in the hinder pair, and more extensive in the female than in the male. Few species (i.e. *longicauda, filicauda, nematogaster*) have unspotted wings, the membrane in these species being often suffused with pale yellow or orange.

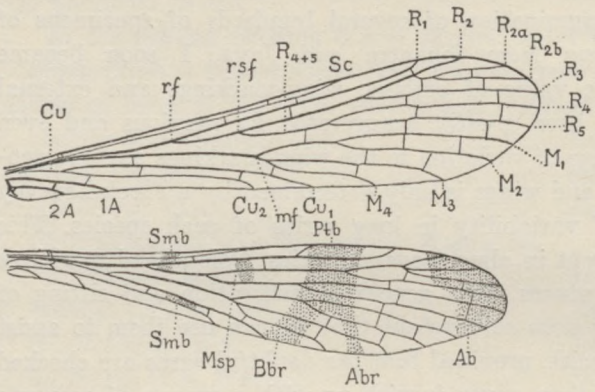


Fig. 1. — Fore and hind wing of *Leptopanorpa*, showing terminology of veins and markings. (Adapted from ESBEN PETERSEN, 1921). Lettering in the text.

In our sketch of the wings (fig. 1) we can distinguish the following veins and markings:

Veins: *1A* and *2A*, first and second anal veins; *Cu*, cubitus; Cu_1 and Cu_2, first and second branches of the cubitus; M_1, M_2, M_3 and M_4, the four branches of the media; *mf*, fork of the media; R_1, R_2, R_3, R_4 and R_5, the five branches of the radius; R_{2_a} and R_{2_b}, the two branches of R_2; R_{4+5}, the common stem of R_4 and R_5; *rf*, fork of the radius; *rsf*, fork of the radial sector; *Sc*, subcosta.

[1]) G. C. CRAMPTON: The genitalia and terminal abdominal structures of male *Neuroptera* and *Mecoptera*, with notes on the *Psocidae, Diptera*, and *Trichoptera*. Psyche (Boston), 25, 1918, p. 47 - 59.

Markings: *Ab,* apical band; *Abr,* apical branch of pterostigmal fascia; *Bbr,* basal branch of pterostigmal fascia; *Msp,* median (or marginal) spot; *Ptb,* pterostigmal band; *Smb,* rudiments of the submedian band. [Basal spots (*Bsp*) omitted in the figure].

The male abdomen. — In all Malaysian species examined the first segment is strongly modified, being fused to the metathorax. As in *Neopanorpa* the first tergum is divided into an anterior and a posterior plate. The former is narrow, transverse and usually distinctly upturned; anteriorly it is fused to the postnotum of the metathorax. The first sternite is extraordinarily small but remains as a pair of very narrow lateral plates. Each of the segments 2 - 5 has a chitinised undivided tergum and a somewhat less strongly chitinised sternum, between which a soft pleural membrane on either side is clearly discernible. In the anterior part of each segment, except the second, there is a minute sclerite, situated nearer the sternum than the tergum.

The middle part of the hind margin of the third tergite is distinctly produced apicad; this process reaches to about the middle of the fourth tergite. It is slightly different in shape in the various species of the genus and can be used as a specific character in mature specimens only. The fourth tergite in the majority of Malaysian species bears a distinct knob-like or conical production on its middle, the rounded apex of which being almost in contact with the subapical portion (or with the tip) of the process of the preceding segment. In *filicauda* this knob is low and indistinct; in *longicauda* it is unapparent and indicated only by a bunch of short, stiff hairs; lastly, in *robusta,* it is entirely absent.

> Issiki (*loc. cit.,* p. 324) has observed in the male of *Neopanorpa ophthalmica,* that the costal margins of the left or right pair of wings of the female are held between the finger-like process of the third segment and the raised portion of the fourth segment, during copulation.

As in *Neopanorpa,* the segments 6 to 8 are without any sign of the pleural membrane, which has apparently become entirely chitinised, leaving the spiracles in their original positions. The segments 7 and 8 are much narrower than the preceding segments and, in most species, are enormously drawn out.

Male genitalia. — As in *Neopanorpa* the ninth abdominal segment is highly specialized. In the proximal area the fused tergite and sternite overlap the basal part of the gonopod or gonostylus, which consists of two segments. The basal or genital segment has been called basistylus (fig. 2 B and C, *bas*), the apical segment dististylus (fig. 2 B and C, *dist*). The basistylus is large, swollen and fused with the coxite; it forms the main portion of the so-called genital bulb. The dististyli — forceps or chelae — are more or less broad at the base, tapering towards the pointed apices, which are curved inwards. Each dististylus is dicondylic, articulated with the basistylus by dorsal and ventral points. It is provided basally with at least one somewhat triangular or finger-like process, which is directed inwardly; in most species on or near the base of the process there is a strongly chitinised, deeply coloured smooth

area with raised margin, which is sometimes provided with irregular knob-like protuberances and stiff bristles. The shape and armature of the dististylus is characteristic for each species. The tergite of the ninth segment is oblong, or squarish, and is designated as epiandrium (fig. 2 C, *ep*). This dorsal appendage, or prëpiproct, is differently shaped in all known species of *Leptopanorpa,* and covers the dorsum of the modified ninth segment, sometimes projecting beyond its extremity; the epiandrium in some species bends strongly downwards and laterally surrounds the rudimentary terminal segments, which are scarcely visible. The tenth segment, whose sternum is always preserved, is very small; it bears the so-called cerci, which are one-segmented and originate close to its margin, where they are well visible on each side of the epiandrium.

The sternite is considerably prolonged and free towards the apex. It lies on the ventral surface of the swollen bulb of the gonostylus and is always divided into two branches. This modified part of the sternum has been designated hypandrium. In all species of *Leptopanorpa* the hypandrium is sessile or shortly stalked; the two branches (fig. 2 B and C, *brhyp*) — hypovalvae, or ventral appendages — which exhibit a remarkable series of modifications in different species, are well developed and can be used with advantage as a specific character.

The aedeagus. — This organ is perhaps the most interesting and most complex structure of the whole genital apparatus of the *Panorpidae.* As in *Panorpodes, Panorpa* and *Neopanorpa,* the apical part of the vasa deferentia forms a large sac and occupies the space at the base of the fused basistylus, extending from within the bulb on the ventral side. Ventrally, this sac is completely hidden and well concealed under the leaf-like branches of the hypandrium, while, on its dorsal side, it is overlapped by the sub-cordate hypandrium. It is not clear where the apex of the sac opens, but probably it does so between the bases of two pairs of chitinous structures, which themselves form the apical part of the penis. The penis, or penile organ, is formed by the fusion of two pairs of complicated elements, which may here be designated ventral and dorsal valves (fig. 2 B and E, *vv* & *dv*). Both are very weakly chitinised structures, which are fused at their bases. It is very probable, though not certain, that the ventral and dorsal retractor muscles of the aedeagus are attached somewhere laterally, and in some species dorsally, of the fused basal portion of these two pairs of valves, since the prolongation and points of attachment of the dorsal valves in most species are clearly recognized on each side of the basal trunk, fitting on to the inner (dorsal) wall of the fused basistylus and disappearing sidewards under each of its free raised margins. The dorsal valves of the species of *Leptopanorpa* are not nearly of so complex a structure as they are in the less specialized genera *Neopanorpa* or *Panorpa;* they are always in the form of more or less approximate, parallel, finger-like rods, which, in only few species (*filicauda,* pl. 11) bear an indication of small apical

protuberances, which may be the remnants of dorsal titilators. In the other species examined, the dorsal valves bear only more or less acute longitudinal ridges or small transverse protuberances, mostly near their apices. Lateral processes of the dorsal valves are wanting.

The structure of that part of the aedeagus termed v e n t r a l v a l v e in *Leptopanorpa* is again of a simple nature, and the different parts are not easily made out. They are very thin and weakly chitinised, beautifully developed and essentially different in the various species. The pair of filamentous ventral processes arising from the chitinous outgrowth at the extreme proximal end of the ventral valves, termed v e n t r a l t i t i l a t o r s by systematists, is luxuriantly developed in the species of *Panorpa,* as are also the lateral titilators in this genus. In *Neopanorpa,* however, the ventral titilators are mostly broad and flat, or very short; lastly, in the known species of *Leptopanorpa* they appear to be absent altogether, and instead of them, each of the ventral valves is provided with one or two lateral processes (fig. 2 D, *lpvv*) of very variable shape (cf. *erythrura,* fig. 2 D, *lpvv; inconspicua, robusta*). In the most specialized species, *filicauda, longicauda,* and *nematogaster,* the whole complex is contracted and simplified, even the last mentioned processes having disappeared almost completely. As stated before, the different forms of the aedeagus afford excellent specific characters.

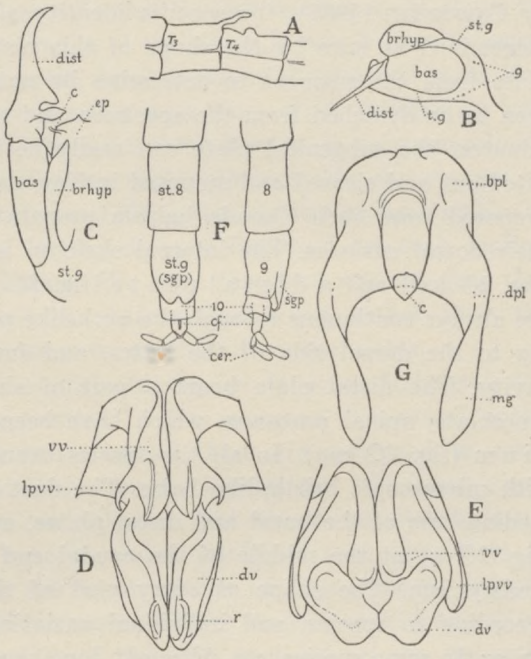


Fig. 2. — Male and female abdominal structures in various species of *Leptopanorpa.* Explanation in the text.

The f e m a l e a b d o m e n. The abdomen of the female of *Leptopanorpa* is very similar to that of the allied genus *Neopanorpa,* and the generic characters found in the length and shape of the terminal segments of the opposite sex do not hold good for the female. The body tapers gradually to the rear and the segments are not modified, nor are there any processes or chitinous outgrowths on the back of segm. 3 and 4. Usually, as in our fig. 2F of *erythrura,* the tenth segment is telescoped within the preceding one and therefore only partly visible. The eleventh segment, of which only a rudiment of the sternite is preserved, is not visible; from the dorsal surface of the membranous tergite arises a pair of two-jointed cerci (*cer*), the basal joint of which is articulated to a large piece, called the cercifer

(fig. 2F *cf*). — The following peculiarities of the terminal segments of the *Panorpidae* are taken from ISSIKI's account. Save for a few differences, these characteristics are also applicable to the species of *Leptopanorpa*.

The ninth segment in which the gonopores open, has undergone considerable modification. The sternum, or subgenital plate (fig. 2F, *sgp*) is large and its distal part is free and somewhat produced to behind. Between the plate and the main part of the segment a broad genital cavity is enclosed. To the dorsal wall of this cavity, at about the middle of the segment, a somewhat complicated chitinous structure is attached, which has been called the internal skeleton by MIYAKÉ (1913). Through this plate-shaped organ open the fused terminal ducts of the receptaculum seminis. As has been pointed out by CARPENTER (1931), the specific identity of a female in many cases can be determined at once by the shape of this plate. It is necessary to remove the plate from the segment to determine its nature. The end of the abdomen is then to be detached from the specimen and relaxed in boiling water for a few minutes; the subgenital plate can easily be bent back and the internal plate lifted out and cleared and mounted in Canada balsam. Our drawings have been prepared from such Canada balsam preparations in which the plates rest on their dorsal surfaces. The internal skeleton is composed af a basal plate (fig. 2G *bpl*) and a distal plate (fig. 2G *dpl*). The basal and distal plates are always continuous through the neck-like portion, the former usually extending to the dorsal side of the latter, and fusing with the dorsal wall of the cavity. The distal plate bears a pair of slender, usually somewhat twisted, lanceolate, apical processes, which have been called by CRAMPTON medigynium (fig. 2G *mg*). In all the species examined these processes are covered with microscopic bristle-like hairs. The duct passes through along the swollen median axis of the basal and distal plates, opening at the apex of the cone (fig 2G *c*) at the middle of the caudal end of the latter plate, between the medigynium. The shape of every part of the plate is remarkably different according to species, and individual variation has not been observed by the writer. In some species, e.g. *filicauda, longicauda, javanica,* the proximal portion of the internal skeleton is very weakly chitinised, the outline of the basal side of the median axis, as well as that of the basal plate then being not clearly delimited; therefore, in our sketches of these organs, the supposed limits are indicated by a fine black line. In *L. nematogaster* the basal plate is very large and strongly chitinised, the basal plate being provided on each side with a leaf-like process of almost the same length as the medigynium. In other species (*L. inconspicua, erythrura, peterseni*) the much swollen median axis is strongly produced basally, bearing knob-like protuberances of various shape.

Unfortunately, I have not been able to learn the details of the genitalia of the types of all the confused species, but in the majority of them the classification could be placed on a firmer ground.

It is hoped that the solution here proposed for this geographical section of the genus will be found acceptable and the new classification therefore

prove to be a useful starting point for further investigation, which is very urgently needed.

DISTRIBUTION.

The geographical distribution of the genus exhibits certain peculiarities which are worthy of note.

As we have seen before, *Leptopanorpa* as now understood, consists of 16 species and 1 subspecies, two of which occur in Japan, three or four are from the southeastern part of continental Asia, and the remainder are from Sumatra and Java. The occurrence of two species in Japan is of great interest. It seems useful to notice that neither MIYAKÉ nor ISSIKI, two well-known Japanese authorities, have ever succeeded in collecting further specimens of these two species, *ritsemae* and *sieboldi*. The range of the genus is now known to extend considerably southeastwards. The great development of *Leptopanorpa* in Java, where no less than 11 species occur, together with the scarcity in Sumatra (only 2 species) and the total absence of the genus from Borneo, is very remarkable; and I am at a loss to give a satisfactory explanation of this phenomenon.

As has been pointed out by ISSIKI (1933) the various groups within the genera of the family (i.e. those of *Panorpodes* and *Panorpa*) are each confined to a very limited area of distribution. We may therefore assume that these groups have evolved independently in different countries, rather than that they have migrated from one country to another in recent times.

The large area of isolated mountain masses in Java, as compared with the extent of the lowlands, has resulted in the evolution of several species peculiar to the higher altitudes, and some of these are restricted to rather narrow vertical limits. The zonal limits for the species are still insufficiently known, but in the next chapter we will see that the zonal distribution is correlated with and dependent from the adaptability of each species to the conditions of the environment. In the Javan species of *Leptopanorpa* irregular overlapping areas is a common phenomenon, but we sometimes find one species extending over a considerable portion of the area occupied by the genus and including the entire *local* area of some of the other species. On Mt. Gedeh-Panggerango for instance, *L. longicauda, filicauda,* and *erythrura* are each restricted to different and very limited portions of the mountain slope [1]), whereas *nematogaster* — though sparingly — occurs in every suitable place from 1300 - 1600 meters above sea-level.

HABITS AND ENVIRONMENT.

With other inconspicuous and fragile insects, the scorpion-flies have not received much attention from entomologists generally and they are poorly represented in most collections. This is due chiefly to the fact that they occur

[1]) *L. longicauda*: northwestern slope (600 - 800 m), *filicauda*: eastern slope (1600 - 1800 m), *erythrura*: northern slope (1000 - 1300 m).

in inaccessible and unpleasant spots, out of the usual track of an insect-collector. For the scorpion-flies prefer shady places in very damp forest, where butterflies and other highly coloured objects are scarce, and where the persistency of the numerous leeches absorbs most of the collector's attention. The majority of the species inhabit primeval forest in mountainous districts, often at considerable altitudes above sea-level.

As I have pointed out elsewhere [1]), the Malaysian scorpion-flies are well adapted to a life in the damp atmosphere of a tropical rainy forest. Most species, if not all, on emerging from the earth that gives them birth, depart immediately from their hiding-places among the thick undergrowth of the wood, settling gregariously on the broad and nearly always wet leaves of forest-plants. Begonia's, arums (*Schismatoglottis*) and low ferns and palms, such as *Curculigo capitulata* and *Selaginellae*, are beloved resting-places for these hygrophilous insects. They naturally congregate at such spots, and it is evident that those insects requiring humid soil-conditions form natural societies which, in most cases, occupy only limited patches of the forest.

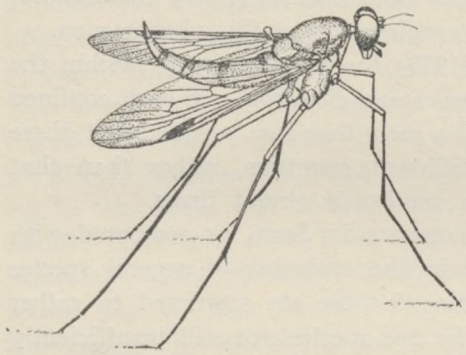


Fig. 3. — *Chrysopilus ferruginosus* WIED., in resting position (× 3).

In the rain-forests of West and Mid Java I have noticed several species of *Neopanorpa* and *Leptopanorpa* keeping company with other fragile insects, e.g. species of the cicindelid genus *Collyris*, dipterous insects of the family *Leptidae* (*Chrysopilus* spp.) (fig. 3), *Calobata* and *Nothybus biguttatus* VAN DER WULP among the *Calobatidae*, and numerous dolichopodid flies. Especially *Chrysopilus* and *Nothybus* (fig. 4 - 5) are regular companions of the scorpion-flies, and it is particularly interesting to note that some of them have similar habits, bearing a striking superficial resemblance to the pale-coloured *Leptopanorpae*, more especially to the females.

On being startled and dislodged, the scorpion-fly flies away, sometimes covering rather long distances; but their repellent instincts appear to prevent any wanderings, and sooner or later they always return to the original spot. This scrupulous flocking together of so many species of *Leptopanorpa* being doubtlessly correlated with a special degree of humidity of the atmosphere, we notice in consequence a strong tendency towards a softening of the tegument, and it is now easily understood that these delicate insects rapidly wither in a dry atmosphere, which fact obviously accounts for their limited powers of

[1]) M. A. LIEFTINCK: On Malaysian Scorpion-flies. Verslag 14de vergadering van de Afdeeling. Ned. Oost-Indië v/d Nederl. Entom. Vereeniging, dl. 1, no. 4, 1 Jan. 1933, p. CXVII - CXX (in Dutch); id.: Uit het leven der schorpioenvliegen (*Panorpidae*). De Tropische Natuur, 23, 1934, p. 64 - 70, figs (in Dutch).

distribution. The flight is weak and not sustained. In most places they fall an easy prey to the collector's net.

The sensitiveness of moisture is not, as was first thought, especially developed in those species in which the abdomen is most attenuated; *L. erythrura* for instance, which has not yet been found on the drier mountain-slopes, is a comparatively robust and solidly built insect, in which the body-segments are not noticeably elongated, whereas *nematogaster* and *longicauda*, two species apparently dwelling in quite similar places, are much slenderer and more delicate members of the genus. *L. javanica*, too, is a slender species, but, unlike the others, it inhabits plain forest and has adapted a life in relatively dry country.

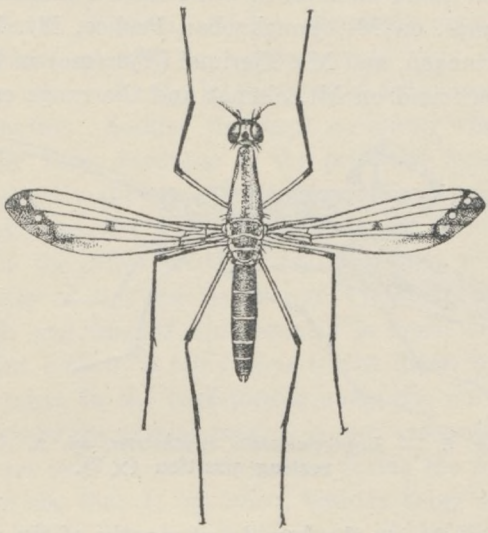


Fig. 4. — *Nothybus biguttatus* V. D. WULP (× 3).

Speaking generally, the ocurrence of a given species of scorpion-fly on a mountain slope is rather a matter of opportunity: given suitable conditions will be a guarantee for its subsistence as long as these conditions prevail.

W. VAN BEMMELEN [1]) and J. BOEREMA [2]) have constructed beautiful isohyetic maps showing the mean annual and monthly rainfall on Java as well as the average number of rainy days during the four consecutive and for every station driest months of the year on the same island. These maps are based on observations made at approximately 2500 stations up to the year 1928, and, as appears from these maps, the quantity of rain and number of rainy days depend largely on the situation of the mountains. It has also been pointed out by BOEREMA that in practically the whole of Java the driest four months of the year occur during the southeast monsoon. Where the southeast monsoon, after its free course over the Indian Ocean, is forced to rise, cloud- and rain-formation increase. The most intense drought occurs where the southeast monsoon crosses

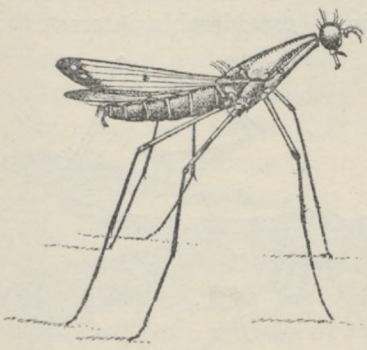


Fig. 5. — Typical resting position of *Nothybus biguttatus* V. D. WULP (× 3).

[1]) W. VAN BEMMELEN, Regenval in Nederlandsch-Indië. Verhand. Kon. Magnetisch en Meteorologisch Observatorium Batavia, 14, dl. 1 (vol. 1), 1925.

[2]) J. BOEREMA, Idem, dl. 2 (vol. 2), 1925 and: Gemiddeld aantal regendagen ... etc., Verhand. 23, 1931.

a mountain-ridge and descends into the plain where it causes fön-like winds in flat country. In West Java the highest number of rainy days has been observed among the extensive range of the Sanggaboeana, Gedeh-Panggerango and Salak mountains, while further maxima have been registered in the Djampangs, on Mt. Tangkoeban Prahoe, Mt. Malabar, various mountains of East Priangan, and Mt. Tjerimai (Tjaréme) in Cheribon. In Mid Java these maxima are found on Mt. Slamat and the range eastern to it, including Mt. Oengaran, the Merbaboe and Merapi volcanoes. In East Java the greatest rainfall is observed — among several unexplored mountains — on Mt. Lawoe, the Tengger Mts., the southern slopes of Mt. Raoeng and the adjoining Idjen Plateau. As is well shown on BOEREMA's map of the average number of rainy days during the four driest months of the year, the number of rain-days during this period decreases in Java generally from West to East, and because the southeastern slopes of the mountains force the monsoon to rise, there is also a decrease from South to North, because the northern coastal plains lay in the rain-shadow.

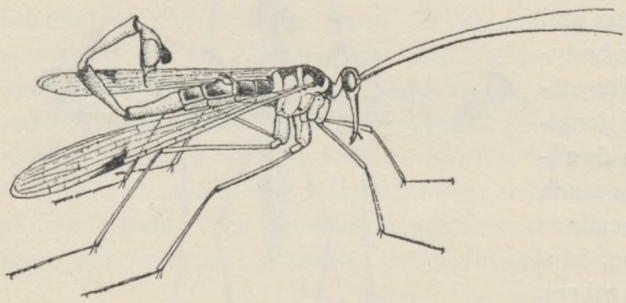


Fig. 6. — *Leptopanorpa erythrura*, sp. n. ♂. Typical resting position (× 3).

Although many mountain-slopes with a great fall of rain have remained practically unexplored, our knowledge on the distribution of Javan scorpion-flies being thus rather too fragmentary, yet it is of considerable interest to learn from the above observations that the known areas of distribution of Javan *Leptopanorpa* coincide with the areas of the greatest rainfall, — provided suitable climatic and soil-conditions; scorpion-flies of this genus being specifically as well as numerically most abundant on those localities where the mean annual rainfall amounts at least from 2500 - 3000 mm; or, taking into account BOEREMA's further climatic observations, that almost all species inhabit places where the mean number of rainy days during the four driest months of the year comes at a

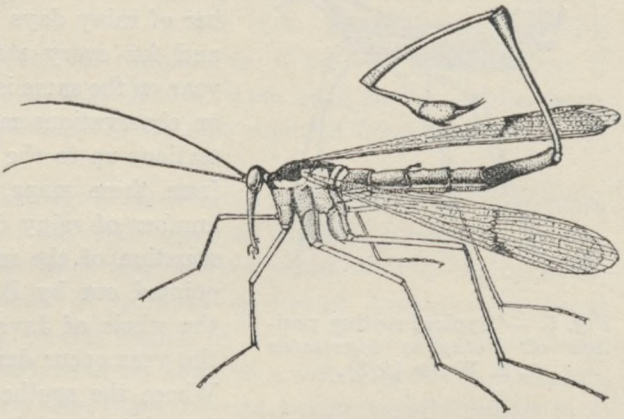


Fig. 7. — *Leptopanorpa longicauda* V. D. WEELE. ♂. Resting position (× 3).

minimum to 20 - 30, usually to more. In West Java, where more precise data are available with respect to the altitudinal range of each species, these figures are an average higher.

Having now seen that most species are restricted to the submontane and montane zone, there is one species, viz. *L. javanica,* which is seemingly capable to live under purely tropical conditions or even in comparatively very dry country; up to this time it has been observed only in the coastal forest zone. On Java it has a scattered distribution: besides the type-specimen whose locality is unknown, it was found by Edw. Jacobson in the primeval forests on the island of Noesa Kambangan, slightly above sea-level. Noesa Kambangan has an exceptionally wet climate and is heavily wooded (mean annual rainfall 3825 mm, and about 46 rainy days in the driest four months). A second, more westward but not very remote locality of this species is near Tjidamar, also on the south-coast of Java; although well wooded, this country is much drier (rainfall 2500 - 3000 mm annually, but only 0 - 5 rainy days in the driest four months). Lastly, *javanica* has been taken in the teak-forests along the north-coast of Mid Java, near Semarang, where the annual rainfall is low, amounting to 2000 - 2500 mm, and where there are only 15 - 20 rainy days during the four driest months of the year. Thus, we see that *L. javanica,* besides being less selective as to its habitations, has a wider distribution than any of the other species. With *L. nematogaster* it is the only species found also in Sumatra (both doubtfully!), and it has been reported as far north as Burma and Hainan.

F o o d. — In the forest of Mt. Bèsèr, West Java, *L. erythrura* is a common species in certain restricted places and it was here that I once made an observation on the natural feeding-habits of this species which, though rather fragmentary, deserves our attention.

On Sept. 30, 1934, while collecting in this place, I noticed four specimens, three males and one female, of *L. erythrura* sitting on the flat surface of a leaf of *Phaeomeria solaris.* The insects attracted my special attention for I had never seen before such striking an assemblage of individuals settled on a single leaf. On getting nearer, the scorpion-flies became under close observation; yet they did not fly away nor even did they move, and I soon noticed that they were all seated round a little heap of an orange-coloured substance, with their rostrum stretched out and touching the bright patch of vegetable matter. The specimens then were captured and the food was examined. It consisted apparently of a mixture of *Ficus* (?)- seeds — which gave it the bright orangish tint — and the pappy remains of decaying vegetable matter, which I was unable to determine. My friend Dr. H. Muller, who had taken some individuals of *erythrura* in the same locality a month in advance, told me afterwards that he had also observed a few scorpionflies feeding on this reddish substance, which is often seen on the leaves of forest-plants. Possibly it originates from fruit-eating bats, of which some species have the habit of ejecting part of their food, spitting out the indigested remains; or from fruit-pigeons which may have the same habit. So much is certain, that *Leptopanorpa,* like the other members

of the family, feeds upon dead animal or vegetable matter and they do not seem to touch a living uninjured animal of any kind. This is in full accordance with MIYAKÉ's observations on *Panorpa klugi* MCLACH., with SHIPEROVITSH's and STEINER's notes on the biology of *P. communis* L., and with CARPENTER's general account on the feeding-habits of *Panorpidae* [1]) (*postea*).

Behaviour in captivity. — On August 9, 1931, four males and six females of *L. nematogaster* were captured in the forest near Telagawarna, an old crater-lake on the Poentjak-pass, about 1450 meters above sea-level. These specimens were carried to the laboratory at Buitenzorg as soon as possible, and placed in a large round glass-vessel, 40 cm high and with a diameter of 36 cm; on top this vessel was covered with a movable piece of wire-screen and the bottom of the glass was filled with a thick layer of moist earth, rotten leaves and moss, in which various plants, such as *Commelina*, arums and a few begonia's were planted. This 'terrarium' was placed indoors and direct sunlight was admitted only during the early morning-hours. In such a way it was hoped that the insects could find suitable sheltered places.

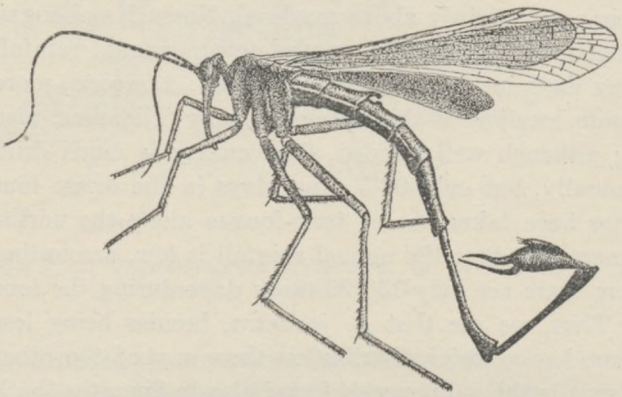


Fig. 8. — *Leptopanorpa nematogaster* (MCLACHLAN). (After KARNY 1923).

Evidently, the scorpion-flies were very thirsty, for as soon as drops of water were poured upon the upper wire-screen and on the surface of the leaves, they approached and sucked them dry very eagerly. It was always seen that the sucking of liquid takes up a long time and when drinking the scorpion-fly remains quite motionless. At times the liquid is discharged, and it was interesting to observe how the long curled abdomen of a male, at intervals of about 2 minutes, is gracefully curled back and completely stretched for that purpose, the forceps then being torn wide apart, on which a small crystalline drop of water is liberated from the tip of its abdomen.

Every morning the upper wire-screen and the leaves were moistened and

[1]) F. M. CARPENTER: Revision of the Nearctic Mecoptera. Bull. Mus. Comp. Zoöl. Harvard College, 72, 1931, p. 214 - 215.

T. MIYAKÉ: The Life-History of *Panorpa klugi* M'Lachlan. Journ. Coll. Agric. Tokyo, 4, 1912, p. 119 - 122.

V. J. SHIPEROVITSH: Biologie und Lebenszyklus von *Panorpa communis* L. Revue Russe d' Entom., 19, 1925, p. 27 - 40 (in Russian, with German summary on p. 37).

P. STEINER: Studien an *Panorpa communis* L. I. Zur Biologie. II. Zur Morphologie und Postembryonalen Entwicklung des Kopfskeletts. Zeitschr. Morph. Oekol. Tiere, 17, 1930, p. 1-67, figs.

always the insects seemed to relish it very much. The first four or five days the scorpion-flies were very active, walking restlessly about among the plants or upside down over the wire-screen. When excited in search of food, the wing-pairs are frequently elevated and depressed alternately; besides this slight and momentary raising ('shrugging') of the wings, these organs are but seldom used in captivity.

As for the food, I first gave small green caterpillars and wounded or freshly killed Tipulids, but the results were not satisfactory; although the caterpillars were also slightly injured and hence inactive, neither these nor the Tipulids were eaten or even touched. I then cut small earthworms into cylindrical pieces, put the fragments on a wet surface or in a drop of water, and then noticed that these pieces of worm were eagerly accepted. The latter were placed upright in order to enable the insects to put in their rostrum conveniently, and so they did, greedily nuzzling round with their mandibles and maxillae. Sometimes a specimen was observed with its rostrum half-way pierced into the fleshy substance. In this way each cylinder was masticated and sucked dry within three quarters of an hour. If the pieces of worm were old and dried up, they were left untouched but when again moistened the deliquescent remnants were sometimes also accepted.

Owing to the wet earth in the terrarium, the interior of my breeding-vessel always contained a high degree of moisture, but nevertheless the insects seemed to require a constant supply of fresh water. To comply with this demand, small quantities of water were at times poured out on the surface of one of the largest leaves. Although it was held already by Miyaké, that too much water finally impedes the movements of these insects, the scorpion-flies enjoyed this sprinkling very much. If, for instance, the leaves, after having been dry for two consecutive days, were sprinkled with water, they would carefully enter the splash with projecting proboscis, then recurved the spirally bent abdominal segments so as to drag the tiny body along through the water, lifted their legs on one side of the body and finally fell down on the other, lying astray on their side and sprawling pleasantly all around in the water. These bathing-habits seemed to be peculiar to the males for the females appeared to be content with drinking.

After about three weeks most individuals became sluggish; they walked around staggeringly with drooping wings and, while drinking, could hardly keep up their bodies. Though they did not take any more food, their limpness could not prevent them from sucking up small quantities of water, but finally they dropped on their sides, being totally exhausted. Probably, the drowsy condition of my scorpion-flies was due to the surrounding temperature being too high in Buitenzorg, the excessive moisture in the breeding-vessel being perhaps also responsible for their untimely death. On September 13 and 14 the last two females died, so that these had remained in captivity for about 5 weeks. The copulation was not noticed, and I have never seen a male approaching his partner for this purpose.

During 1932 many living specimens of *L. erythrura* were brought home from Mt. Panggerango to the Buitenzorg laboratory for breeding-experiments, but these I could keep alive for about ten days only, whereafter all individuals died.

Thus, nothing is still known on the life-history of any of the Malaysian species of *Leptopanorpa,* and although two species were held in captivity for several weeks, the copulation and egg-laying habits were not observed.

SOURCES OF MATERIAL AND ACKNOWLEDGMENTS.

I wish in this place to tender my best thanks to all those, entomologists and collectors, not specially interested in the *Mecoptera,* who have contributed to the completion of this paper and whose names are gratefully mentioned throughout the text. Without the considerable number of specimens received from these collectors, it would have been impossible to deal with this group of insects in any detail. We are permitted to state that even now the Javan jungle remains still far from being fully explored, for nearly every mountain discloses new or interesting forms.

I am much indebted to Dr. H. C. BLÖTE, curator of the Leiden Museum, not only for the privilege of studying paratypes and other interesting specimens in the collection of that Institution, but also for his readiness in correspondence to answer numerous inquiries about specimens which could not be lent out.

Especial thanks are also due to Mr. P. ESBEN PETERSEN (Silkeborg), who has been most generous in the loan of material in his collection.

As to the illustrations joining this paper; all are highly magnified camera lucida drawings, reproduced on the same scale on every plate. The abdomina of the males are slightly modified plain outline-drawings. As to the complicated internal structure of the male genitalia, I had to relieve them from the monotony of dead flatness without departing too widely from the ideal of simplicity and clarity. The application of stipple proved most effective to indicate the relation of the various planes in one rather complex membranous object, while the use of lines — although sometimes perhaps too hard and harsh — was preferred to indicate the degree of pigmentation of the background. The extremely delicate and soft internal skeleton of the female could not be rendered by ordinary outline-drawings. and therefore the ink-sketches had to be worked up with a pencil to produce the half-tone designs on plate 14.

Some striking examples of Malaysian scorpion-flies and *Diptera* are well brought out habitually in the sketches of our native Museum-artist GOESTI ABDOELKADIR.

SYSTEMATIC.

Key to the males.

1. Body enormously drawn out and very slender; peduncle of segm. 9 of abdomen longer than the genital bulb. Segm. 7 and 8 of abdomen at least three times longer than segm. 5. Fourth abdominal tergite at most slightly

elevated before the middle, without knob-like tubercle on mid-dorsum. Abdomen largely pale in colour.

2. Body throughout orange-rufous. Wings unspotted, membrane strongly tinted with yellow, pterostigma amber-brown. *Brhyp.* but little projecting ventrad, narrow and lanceolate, tips reaching beyond hind margin of *bas. Ep.* narrow, gradually diminishing in width towards apex, which is rounded and but slightly downbent. *Dist.* evenly curved towards apices; basal portion with a roundish, hairy, inner tubercle at extreme base, followed by a strong, finger-like interior tooth; angular projection very low and obtuse. Penile organ narrow and slender; *dv.* elongate, sub-parallel, tips with irregular ventral protuberances; *vv.* one-third shorter than dorsal pair, sub-parallel, slightly dilated and hollowed out ventrally, mesal margin swollen and tips also somewhat concave ventrally. West Java ***filicauda***

2'. Body with black markings on the thorax; head and basal portion of segm. 6 also black; rostrum reddish. Wings usually with traces of a *ptb.;* membrane slightly yellowish, pterostigma at least partly brown. *Brhyp.* not projecting ventrad, very narrow and lanceolate basally, their distal portion thread-like, reaching hind margin of *bas. Ep.* plate-shaped and almost rectangular, abruptly narrowed towards apex, which is in the form of a distinct downbent median tonguelet. *Dist.* very long and slender, at first rather straight, thence, after a slight constriction, inwardly bent; basal portion with two conspicuous, irregular, inner tubercles, followed by a very low inner convexity. Penile organ short, broadly cordate or sub-triangular in outline; *dv.* closely approximated, simple; *vv.* nearly equal in length to dorsal pair, strongly constricted before their middle, the divisions thus formed each with a smoothly rounded ventral tubercle. West Java ***longicauda***

1'. Body, though sometimes very slender, generally not so drawn out; peduncle of segm. 9 of abdomen shorter than the genital bulb. Segm. 7 and 8 of abdomen at most three times longer than segm. 5, generally much less drawn out.

2. Segm. 7 and 8 of abdomen about three times longer than segm. 5. Abdomen black. Segm. 9 distinctly pedunculate.

3. Fourth abdominal tergite with a distinct knob-like median tubercle before the middle of segment. Wings very narrow and rather pointed; membrane strongly yellowish, otherwise unmarked, pterostigma very little darker. Body excessively slender. *Brhyp.* rather pointed; membrane strongly yellowish, otherwise unmarked, pterostigma very little darker. Body excessively slender. *Brhyp.* rather distal margin of *bas. Ep.* sub-cordate, apex broadly rounded with very slight median projection. *Dist.* very long and slender, at least equal in length to the genital bulb; basal portion with three approximated inner tubercles, but without submedian internal pro-

jection. Penile organ large; *dv.* straight, lanceolate and parallel to one another, their inner surfaces hollowed out; *vv.* unbranched, strongly outcurved and expanded distally in adult specimens, to form club-shaped processes which are but little shorter than *dv.* Java, Sumatra ***nematogaster***

3'. Fourth abdominal tergite without knob-like tubercle nor elevation before the middle of segment. Wings broader and more rounded apicad; membrane strongly yellowish and at least with traces of a dark brown *ptb.* in front wing and with pterostigma partly brownish in hind wing. Body stouter. *Brhyp.* much longer than in the preceding species, widest in their basal third, then very thin and slender, parallel-sided and strongly diverging apicad, tips upcurved and much surpassing distal margin of genital bulb. *Ep.* elongate, apex rather suddenly narrowed and with a long downbent median projection. *Dist.* thick and strong, decidedly shorter than *bas.*, strongly incurvate and with a robust antemedian internal tooth. Copulatory organ with *dv.* and *vv.* subequal in length, straight, lanceolate and parallel; *vv.* with smoothly swollen ventral ridge, contiguous basally; each of them with two simple lateral processes, which are only half so long. Mid Java ***robusta***

2'. Segm. 7 and 8 of abdomen less than three times longer than segm. 5, or, if so, abdomen for the greater part reddish. Segm. 9 shortly pedunculate.

3. Abdomen for the greater part orange. *Brhyp.* black. All segments comparatively short and compact. Segm. 7 and 8 thick, except at extreme base, barely three times longer than segm. 5, which is very short. Wings narrow and rather pointed; membrane strongly tinged with yellow. Markings reduced; pterostigma dark brown, or *ptb.* incomplete behind; no *smb.*, or at a maximum traces of it along costal margin. *Brhyp.* at first rather narrow, then much widening, hollowed out interiorly and strongly vaulted in profile view, a little diverging and much rounded apically; tips not surpassing distal margin of *bas. Ep.* with apex rather suddenly narrowed and with a distinct median projection. *Dist.* short and slender, much shorter than *bas.* Copulatory organ with *dv.* at least twice longer than *vv.*, pressed closely to one another, each with a well-marked median ridge below, which is divided near the apex so as to enclose an oval depression; apices obtusely pointed. *Vv.* sharply ridged below and with each of their lateral processes only little shorter, hook-like and sharply pointed. West Java ***erythrura***

3'. Abdomen almost entirely black. Segm. 7 and 8 less than three times longer than segm. 5.

4. Wings without any traces of *ab.*; membrane strongly tinged with yellow. An incomplete, dark brown *ptb.*, or only the pte-

rostigma dark brown. Thoracic sides pale in colour; dorsum with black markings. Segm. 7 and 8 similar in form to *erythrura,* though distinctly shorter, 7 longer than 8. *Brhyp.* shaped much as in that species, not surpassing distal margin of *bas. Ep.* also similar but apex more evenly narrowed and median projection decidedly shorter, slightly downbent. *Dist.* thicker, especially at base, equal in length to *bas.* Copulatory organ long and narrow; *dv.* twice longer than ventral ones, scarcely widened basally, strongly and intricately ridged ventrally, with apices rounded; *vv.* slightly incurvate, sharply ridged below and with lateral processes tooth-like and much shorter. West Java ***inconspicua***

4′. Wings at least with traces of *ab.,* or smoky at tips.

5. Wings hyaline, heavily marked; a complete and very broad *ab.,* the inner margin of which is not indented; dark brown *ptb.* forked posteriorly so that a hyaline fenestra is enclosed between the fork and the wing-margin. *Ab* and *ptb.* confluent along costal margin. Elements of (incomplete) *mb.* conspicuous; basal spots present. Rostrum reddish; body otherwise entirely black. Segm. 7 and 8 of abdomen very slender, 7 about twice longer than 5, 8 slightly shorter than 7. *Brhyp.* elongate, almost parallel to one another and but little widened distally; each of them hollowed out interiorly, projecting well beyond distal margin of *bas;* tips rather abruptly rounded and a little upturned apically. *Ep.* plate-shaped and broadly rounded at tip; no median projection. *Dist.* long and slender, not longer than *bas.;* basal teeth robust, short and thick. Copulatory organ with *dv.* long and narrow, sub-parallel, each with a sharp ventral ridge. *Vv.* of intricate build, much shorter than dorsal ones; each of them consists of two widely distant parts, the ventral branch being much enlarged, at first transversely placed and extending basad to form wing-like structures, thence much expanded, outcurved and projecting downward; the mesial branches contiguous, twisted in a vertical plane to form oval lamellae, which are placed in the long axis of the body; *lpvv.* enormously enlarged, strongly incurved apically. West and Mid Java ***javanica***

5′. Wings with *ab.* narrower and incomplete; *ptb.,* if present, narrower, and usually not completely forked posteriorly, not confluent with *ab.* along anterior margin; median and basal spots, if present, usually very small.

6. Thorax almost entirely red, only the prothorax blackish

in front, and the anterior half of the mesonotum blackish or brown.

7. Wings comparatively broad, with apices less pointed. *Ptb.* present. Rostrum entirely reddish. Abdomen long and slender. *Brhyp.* sub-parallel, evenly widened and but little outcurved towards their middle; from that point they are considerably widened and strongly vaulted, the apices being obliquely truncated, reaching beyond distal margin of *bas. Ep.* plate-shaped and broadly rounded at tip; no median projection. *Dist.* long and slender, equal in length to *bas.* Copulatory organ cordiform; *dv.* broadly lamellar, apparently fused basally, not or only slightly ridged ventrally, each tapering gradually towards the end, with inner margins contiguous and straight; *vv.* swollen, much shorter than dorsal ones; ventral branches sub-parallel and a little convergent, each with a knob-like median tubercle which projects ventrad; *lpvv.* widely distant, curving at first outwards and then inwards, the swollen and tubercular tips not meeting. East Java ***sarangana***

7'. Wings narrower, tips more pointed. *Ptb.* absent. Rostrum reddish, dark brown in front. Abdomen long and slender. *Brhyp.* sub-parallel, long and lanceolate, widest at middle, slightly convex interiorly, with tips rather pointed, reaching far beyond distal margin of *bas.* Shape of *ep.* undetermined. *Dist.* a little shorter than in *sarangana*, very slender, apices more incurved. Copulatory organs undetermined. Mid Java ***jacobsoni***

6'. Thorax either entirely black, or at least with rich black markings on dorsum of meso- and metanotum. Wing-membrane hyaline, or faintly yellowish, with dark brown markings.

7. Thoracic sides pale in colour. *Brhyp.* almost filiform with much pointed tips. Dorsum of meso- and metathorax with roundish, pale spots. *Ep.* almost straight cut off behind, its apical margin slightly trilobate.

8. *Ptb.* broad, completely forked behind. *Ab.* abruptly and irregularly indented interiorly. Traces of median and basal dark spots present on both pairs of wings. Genitalia not different from the typical race. Mid Java... ***pi decorata***

8′. *Ptb.* broad, incompletely forked behind. *Ab.* reduced to a cloudy brownish spot at extreme apex. No traces of median and basal dark spots. *Brhyp.* very slenderly lanceolate, slightly outcurved at middle and placed rather in a vertical plane; tips projecting beyond distal margin of *bas.* *Dist.* slender, slightly shorter than *bas.*, with basal protuberance stalked and rather club-shaped, strongly hollowed out anteriorly. Copulatory organ compact and broadly cordate in outline; *dv.* fused in the median line, concave below and obliquely truncated apically; *vv.* much shorter than dorsal ones, shaped as on pl. 13; they are downwardly curved and pressed closely against each other in the median line; *lpvv.* slightly longer, lamellar. Mid Java ***pi pi***

7′. Thoracic sides dark brown or black. Dorsum of meso- and metathorax with the sutures only yellowish. Wing-membrane hyaline or faintly tinged with greyish-yellow. Markings very variable. *Ab.* and *Ptb.* usually well developed, the latter irregularly forked posteriorly; *ab.* occasionally much reduced. Rostrum short, orangish, body otherwise almost wholly black. Abdomen slender but segm. 7 and 8 comparatively short. *Brhyp.* narrowly ovate, strongly hollowed out interiorly, tips rather pointed. *Ep.* broad and plate-shaped with rounded side-edges; median projection slightly prominent, rather rounded. *Dist.* slender, about equal in length to *bas.*; basal armature distinct, trituberculate, one of the projections long and finger-like. Copulatory organ of complex structure. East Java ***peterseni***

Key to the females.

(The females of *L. jacobsoni* (v. d. Weele) and of *pi decorata*, subsp. n., are unknown, while of *pi pi* (v. d. Weele) I have not been able to examine the genital organs).

1. Wing-membrane hyaline or yellowish, or brownish, but never spotted. Pterostigma and wing-tips occasionally slightly darkened.
 2. Body without any black markings. Internal skeleton as on pl. 14. ***filicauda***

2′. Head and abdomen (in adulti also the thorax) for the greater part black, or bronzy-black. Internal skeleton as on pl. 14. ***nematogaster***

1'. Wing-membrane whether or not tinged with yellow, anterior pair of wings at least with an incomplete *Ptb*.
2. At least the tergites of abdominal segments 7 and 8 pale in colour.
3. Abdomen black, or bronzy-black above, segments 7 and 8 reddish; 9th tergite darkened, or black. Internal skeleton as on pl. 14. ***erythrura***
3'. Abdomen black, or bronzy-black; segments 7 - 9 reddish in colour, unmarked. Internal skeleton as on pl. 14 ***longicauda***
2'. Tergites of all abdominal segments black, or bronzy-black.
3. Thorax entirely red, unmarked; occasionally a fine black line along posterior margin of metanotum. Internal skeleton as on pl. 14. ***sarangana***
3'. Dorsum of meso- and metathorax at least with sharply defined pale spots (including *L. pi*).
4. Internal skeleton as on pl. 14 ***inconspicua***
4'. Internal skeleton as on pl. 14 ***robusta***
3". Dorsum of meso- and metathorax all black; the intersegmental membranes usually whitish. Wing-membrane hyaline, or very slightly tinged with yellow.
4. *Ptb* completely forked behind, the forks broad, enclosing a hyaline fenestra. *Ab* and *Ptb* fused along both margins, so that a clear, oval fenestra is enclosed. Inner margin of *Ab* usually straight. *Msp* and *Smb* very distinct. Internal skeleton as on pl. 14 ***javanica*** [1])
4'. *Ptb* incompletely forked behind, or *Abr* very narrow. *Ab* and *Ptb* independent, widely apart, at least posteriorly. Inner margin of *Ab* indented, or otherwise irregular. Basal spots obsolete. Internal skeleton as on pl. 14 ***peterseni***

Leptopanorpa filicauda, sp. n. (Pls. 4, 7, 9, 11 and 14).

1910. VAN DER WEELE, Notes Leyden Mus., 32, p. 200. — ♀ VAN DER WEELE, Mt. Malabar, W. Java (*longicauda*) [2]).

1913. PETERSEN, Notes Leyden Mus., 35, p. 228. — ♂ JACOBSON, Mt. Gedeh, W. Java (*longicauda*).

1921. PETERSEN, Cat. Coll. SELYS, Mecopt., p. 88 (*pars*!), pl. 2 fig. 16 (♂ insect). — ♂ JACOBSON, Goenseng (*errore*!), Mt. Gedeh, W. Java (*longicauda*).

Material examined: — 1 male, 4 females (1 ♀ juv.), W. Java, eastern slope of Mt. Gedeh, Tjibeureum (near Tjibodas), 16 - 1800 m, June 1932, L. J. TOXOPEUS, March 23, 1921, W. M. DOCTERS VAN LEEUWEN, March 28, 1932 and May 18, 1935, AUTHOR; 1 male (ad.), labelled: E. JACOBSON, Goenoeng Gedeh, Java, March 1911 (printed) *Leptopanorpa longicauda* WEELE (PETERSEN's handwriting) "Fig. Catal. SELYS" (printed), in coll. ESBEN PETERSEN; 1 male, 1 spe-

[1]) See the discussion of the ♀ of *javanica* under that species (*postea*).

[2]) VAN DER WEELE collected near Tjinjiroean, a cinchona-plantation situated about 1580 m above sea-level.

cimen (abd. wanting) labelled: Tjibodas, 1700 m, no. 24, 1923, KARNY"; 1 male (juv.), W. Java, northeastern slope of Mt. Kendang, 1650 m, Daradjat, July 12, 1934, AUTHOR. — Holotype: ♂ Mt. Gedeh, Tjibeureum, 1700 m, June 1932, L. J. TOXOPEUS; allotype: ♀ topotypical, 1800 m, March 23, 1921, W. M. DOCTERS VAN LEEUWEN.

Confined to West Java, 16 - 1800 m alt.

♂♀. Body throughout orange-rufous, without any trace of black colouring. Last joint of maxillary palpi brownish at tip. Rostrum relatively short, variable in length. Tarsal joints also slightly darkened apically.

Wings narrow and rather pointed; membrane deep chrome, unspotted [1]). Pterostigma long, deep xanthine orange.

♂. Abdomen at least twice longer than hind wing, usually longer. Segm. 2 a little broader than long; 3 and 4 increasingly longer, 3 hardly longer than broad, 4 more distinctly so, almost twice longer than broad and also a little longer than 3; 5 slightly longer than 4; 6 more than two times longer than 5; 7 and 8 extremely long and slender, each at least one and a half times longer than 6, 8 a little shorter than 7 (or equal in length); 9 longly pedunculate, the stalked portion longer than the genital bulb, which is narrow and small. Third abdominal tergite produced into a very narrow cylindrical process, which is slightly curved in profile view and of equal width throughout, reaching to the middle of segm. 4. The fourth tergite bears a very slight mid-dorsal elevation, just before the middle of the segment.

Appendages shaped as described in the key and as shown on the plates.

♀. Genitalia: internal skeleton small and ovate, widest before the middle, weakly chitinised. Basal and distal plates simple, the former without any processes, the latter rounded, but rather expanded laterally. Cone large, ovate, almost pointed apicad. Medigynium slender, lanceolate, compressed, sub-parallel, tips slightly twisted and a little outcurved.

Size very variable. ♂ abd. + app. 26.9 - < 40; fw. 13.4 - 15.2, hw. 12.2 - 14.5 mm. — ♂ Tjibeureum: segm. 1 - 6 9; 7 6.7; 8 6.2; 9 + dististyli 5 mm; fw. 13.7, hw. 12.8 mm. ♂ Tjibeureum: segm. 1 - 6 9; 7 8.5; 8 7.8; 9 + dististyli 6 mm; fw. 14, hw. 13 mm. ♂ Gedeh (JACOBSON): segm. 1 - 6 11; 7 9.5; 8 9.3; 9 + dististyli 7 mm; fw. 15.2, hw. 14.5 mm. ♂ Daradjat (juv.): segm. 1 - 5 7; 6 (absent); 7 11; 8 10.5; 9 + dististyli 9 mm; fw. 15, hw. 14.2 mm.

♀ abd. ± 9; fw. 13.4 - 14.5, hw. 12.2 - 13 mm.

Among other characters this fine species is readily distinguished from *longicauda* by the great length of the branches of the hypandrium, and by the finger-like projection at the base of the dististyli, which are not dilated nor abruptly incurved before their apices.

[1]) In one of the two females, captured by myself near Tjibeureum, on Mt. Gedeh, all four wings bear a sharply defined greyish-black apical band, whose inner margin is concave; anteriorly, this band extends almost to the orange pterostigma.

The history of this species is as follows. In December 1910, VAN DER WEELE captured a female on Mt. Malabar, along with *L. nematogaster,* and reports on it: "It differs from it [*nematogaster*] by the yellow-red colour of the body, the relatively longer rostrum and the darker legs, which are reddish brown with dark annulations on the tarsal joints". Since *filicauda* is the only species in which the entire body is "yellow-red", we may assume that VAN DER WEELE's specimen is correctly placed under this species. ESBEN PETERSEN also was wrong in determining JACOBSON's specimen from Mt. Gedeh as *longicauda* (loc. cit., 1913). In the monograph the same author gave a re-description of the male of *longicauda,* after the type specimen in the Leiden Museum, but he failed to recognize the Gedeh specimen as a distinct species. A drawing of this we find on pl. II fig. 16 of the monograph, which gives a very good impression of the unusual appearance of this immensely long-bodied insect. The unspotted thorax and the lack of any black markings on the abdominal segments is well brought out here, and a comparison with the insect itself has given definite proof of its specific distinctness. It may be noted, that the darkish shade of the sixth segment, as shown on PETERSEN's figure, is due to the effects of decomposition.

L. filicauda is one of the rarest and certainly the most grotesque of all known species. So far as my own experience goes, it is confined to the higher mountain-zone of West Java, where small and isolated colonies may be found in the most humid regions of the forest. Unlike other species of *Leptopanorpa,* such as *nematogaster,* it is remarkably restricted in its habitats. On the eastern slope of Mt. Gedeh *filicauda* has established itself for years and years in a few road-side spots near the Tjibeureum-falls, where it is almost certainly to be met with during most of the year, but always solitarily. The elusiveness of these remarkable insects is best understood from their habits of rambling about among wet vegetation in the shelter of palms and ferns, usually close to the ground. When disturbed they fly up from below, settling on the broad leaves of *Begonia* and *Araceae,* and then are an easy capture.

Leptopanorpa longicauda VAN DER WEELE (Textfig. 7, pls. 5, 7, 9, 11 and 14).

1909. VAN DER WEELE, Notes Leyden Mus., 31, p. 11-13, fig. 7-8 (♂ apps.), pl. 1, fig. 5 (♂ insect). — ♂ MÜLLER, Java.
1910. ENDERLEIN, Zool. Anzeiger, 35, p. 392-393. — ♂ Soekaboemi, W. Java (*Himanturella tubifera*).
1912. ENDERLEIN, Notes Leyden Mus., 34, p. 237-238. — Remarks (*Neopanorpa longicauda* + *tubifera*).
1915. PETERSEN, Entom. Meddel., 10, p. 231, cat. no. 6 and 7. — No description (*longicauda* + *tubifera*).
1921. PETERSEN, Cat. Coll. SELYS, Mecoptera, p. 88 (pars !). — ♂ MÜLLER, Java.
1921. PETERSEN, Ibid., p. 88-89. — Original description cited (*tubifera*).
1923. KARNY, Treubia, 3, p. 382. — Remarks (*tubifera*).
1934. LIEFTINCK, De Trop. Natuur, 23, p. 66 fig. 3 (♂ insect), 69 (*tubifera*).

Material examined: — 56 males, 42 females, W. Java, northwestern slope of Mt. Gedeh, 800 m, Tapos, 1932 - 1934, all the year round, L. G. E.

Kalshoven and native coll.; 2 females, W. Java, Mt. Salak, 600 m, May 28, 1926, L. G. E. Kalshoven; 6 males, W. Java, Djampang Tengah, Mt. Tjimerang, 600 m, March 1934, and Djampang Koelon, Mt. Malang, 600 m, May 1934, M. E. Walsh.

Confined to the lower mountain zone of West Java.

♂♀. Body-colouring largely pale, marked with brown and black. Head shiny black. Antennae dark brown, except torulus and first two joints which are flesh-coloured; base of third joint reddish. Rostrum long, wholly orange-rufous in front, growing paler aside and below; palpi of the same colour, the last joint of maxillaries darkened.

Ground-colour of pro- and synthorax orange-buff. Prothorax wholly black above, sutures also black. Dorsum of meso-metathorax black, each with a large oval pale spot placed on both sides after the middle, the median third of the nota thus remaining black. Sides pale with two pairs of minute black points.

Legs pale yellowish; outer sides of all tibiae and apices of tarsal joints a little darker.

Wings narrow and rather pointed, variable in width; membrane tinged with light ochraceous buff. Markings variable to some extent, russet, cinnamon-brown, or mummy-brown; different in both sexes.

♂. Front and hind wings at least with the proximal third of the pterostigmal space brown; front wing at a maximum with complete, irregular, pterostigmal band, with a small spot in the fork between R_1 and R_{2-5} in front wing, and with a dot in the distal edge of submedian space of both pairs of wings.

Abdomen at least almost twice longer than hind wing, usually much longer. Segm. 2 a little broader than long; 3 and 4 increasingly longer, 3 longer than broad, 4 more distinctly so, almost twice longer than broad and decidedly longer than 3; 5 subequal in length to 4; 6 hardly two times longer than 5, usually distinctly bent before its middle and with apex upcurved in profile view; 7 and 8 extremely long and slender, each at least one and a half times longer than 6, 8 a little shorter than 7; 9 longly pedunculate, the stalked portion longer than the genital bulb, which is narrow and still more evenly widened apically than in *filicauda*. Third abdominal tergite produced into a slender, cylindrical, curved process, which is distinctly clubbed apicad, not reaching beyond two-fifth of the length of segm. 4; apex with a bunch of stiff, backwardly directed, dark brown hairs. The fourth tergite bears a very low mid-dorsal elevation just before the middle of segment, which is also clothed with short, backwardly directed hair.

Coloration of abdomen for the greater part pale. In well preserved specimens segm. 1 is brown above, paler aside; the tergites of 2 - 5 are tawny, each with a rather diffuse brownish side-band and with postero-lateral edges deep black, hind margin of 4 and 5 usually also finely bordered with black. Sternites of 1 - 5 orange-buff, apical edges of 2 - 5 with a jet-black dot and with the hind margins also finely bordered with black. Basal half, three-fifth,

or two-third of segm. 6 glossy dark brown to black, this colour rather suddenly passing to bright orange behind, the apical margin of this segment bordered with black. Remainder of segments lighter than the basal ones: 7 - 9 and appendages throughout light orange-yellow to orange, only the lateral and ventral edges of the apical margin of 7 and 8 with a fine black border. Appendages shaped as described earlier and as shown on pls. 9 and 11.

♀. Head and thorax coloured as in the male. Wings more heavily marked; pterostigma at least with the proximal half and the distal edge filled in with brown and with the pterostigmal fascia broken up into a few spots of variable size (sometimes reduced so much as to be entirely absent in hind wing). Front wing at a maximum with complete, though narrow, pterostigmal band, a point between M_3 and M_4 close to the wing-margin, and three dots, two submarginal (median and submedian) and one submedian (between Cu_1 and Cu_2). Hind wing at a maximum with narrow pterostigmal band, and a small submedian spot, between Cu_1 and Cu_2.

Abdomen coloured quite differently from the male. Tergites of segm. 1 - 6 unicolorous shiny black, sometimes with low metallic-green reflex; intersegmental membrane and all sternites pale in colour (usually flesh-coloured, or pale orange-yellow). Segm. 7 - 10 light red; appendages black.

Genitalia: internal skeleton small and very slender, widest behind the middle, weakly chitinised. Basal and distal plates simple, the former without any processes, the latter narrow. Cone large, narrowly ovate, almost pointed apicad. Medigynium slender, lanceolate, depressed, slightly incurved towards the apex, tips not outbent.

Size very variable. ♂ abd. + app. 20.5; fw. 12, hw. 10.8 mm (smallest specimen, Tapos); abd. + app. 33; fw. 14.5, hw. 13 mm (largest specimen, Tapos). ♂ Tapos: segm. 1 - 6 8; 7 4.3; 8 4; 9 + dististyli 4.2 mm (smallest specimen); ♂ Tapos: segm. 1 - 6 11; 7 8.2; 8 7.1; 9 + dististyli 6.7 mm (largest specimen); ♂ Mt. Malang: segm. 1 - 6 9.5; 7 5.5; 8 4.5; 9 + dististyli 4.5 mm.

♀ abd. 9 - 10.5; fw. 11.6 - 14.5, hw. 10.2 - 13.3 mm.

Although I have not been able to re-examine the type of this species, VAN DER WEELE's description of *longicauda* is sufficiently clear to enable one to differentiate this species at once from all its congeners. As appears from our description, which was compiled after studying a great many specimens, the majority of *longicauda* males have a distinct, though mostly incomplete pterostigmal band and a number of small spots on the wings, whereas specimens with poorly developed markings, or those with almost spotless wings, are much less commonly found. Unfortunately, the wings of the type are just like those of *filicauda* LIEFT., as well as those of a couple of other species with unbanded wings, described later, so that the true *longicauda* was often wrongly identified and confused with other species.

L. longicauda is at once distinguished from *filicauda* by the black head, the two oval spots on the meso- and metathorax and the black colour of the

basal half of the sixth abdominal segment. These characters, as well as the strongly curved "forceps" of *longicauda*, have explicitly been mentioned in the original description. As we will soon notice, however, the proportionate lengths of the abdominal segments 6 - 8 are incorrectly given by VAN DER WEELE, while his sketches of the 9th segment are rather poor.

One year later, ENDERLEIN described *Himanturella tubifera*, from near Soekaboemi, in West Java. I believe it for certain that we are dealing here with *longicauda;* ENDERLEIN described *tubifera* in 1910 without knowing of VAN DER WEELE's description of *longicauda;* at least he makes no references in his paper to VAN DER WEELE's insect. In 1912 *L. tubifera* is placed in the genus *Neopanorpa*, along with *nematogaster, jacobsoni* and *longicauda*. On p. 238 the author remarks: "*Neopanorpa longicauda* (V. D. WEELE) ist der *N. tubifera* (ENDERL.) sehr ähnlich, die Flügel sind ebenfalls nicht gezeichnet, aber die Längenverhältnisse der Abdomensegmente sind ganz anders." [1]). E. PETERSEN, who has neither seen *tubifera* nor the true *longicauda*, quotes ENDERLEIN's description in his monograph (1921), comparing *tubifera* with *charpentieri* (= *nematogaster* nob.) and *jacobsoni*. His statement of the upper appendages "being strongly incurved laterally at the apex, the tips being narrow and cut off" (after a sketch of the type specimen of *tubifera* END.) applies perfectly to *longicauda*, a species with which we have seen PETERSEN had no acquaintance. This is evidently the reason why PETERSEN cautiously retained *tubifera*, although he does not give an explanation.

On comparing VAN DER WEELE's incorrect measurements of the abdominal segments of the type of *longicauda* ("....the sixth nearly three times longer than the fifth, the seventh and eighth three times longer than the sixth", *loc. cit.* p. 13) with the photograph of the same specimen on pl. 1 fig. 5, it is at once evident, that these statements are absolutely wrong. ENDERLEIN then not only overlooked this error, but perpetuated the confusion in creating a new species with exactly the same characters as *longicauda*.

This decorative and equally bizarre species is apparently confined to the lower mountain districts of West Java, where it has a scattered distribution. Its absence from the northern slope of Mt. Gedeh is noteworthy and obviously due to the complete devastation of all forest below altitudes varying between 1100 and 1500 metres above sea-level. At Tjisaroea, on the northern slope of this mountain (properly of the extinct twin-volcano Panggerango), virgin forest begins at about 1000 meters and, although the condition of the soil and humidity are not noticeably different, this locality is evidently too high for *longicauda*, for the only species living here are *erythrura* and *nematogaster*, the former being a moderately common insect. At Tapos, on the northwestern slope of the said volcano, primeval forest is likewise still in existence and it is in the dampest places of the dark ravines, from 7 - 800 m above sea-level, where *longicauda* has maintained itself, forming large colonies in a few favourable spots. In the mountainous Djampang country, south of Soekaboemi, there is

[1]) The spacings are mine.

much virgin forest still left upon the hills and here also the species has hitherto found a safe refuge, but, owing to the extensive cultivation, the recesses will not long exist, as the slopes of the main valleys and their branches are everywhere cut in terraces up to a considerable height, so that many patches of forest are gone for ever.

Leptopanorpa nematogaster MCLACHLAN. (Textfig. 8, pls. 4, 8, 9, 11 and 14).

1869. MCLACHLAN, Trans. Ent. Soc. London, p. 69, pl. 4 fig. 12. — ♀ WALLACE, Java (*Panorpa*).
1875. MCLACHLAN, Ibid., p. 188. — Same specimen (*Panorpa*).
1909? VAN DER WEELE, Notes Leyden Mus., 31, p. 5 (key), 9-10, fig. 4 (apps. ♂). — ♂ MÜLLER, Java and ♂ LUDEKING, Ambarawa ((*Neo*)*panorpa*).
1910. VAN DER WEELE, Ibid., 32, p. 200. — ♂♀ Mt. Malabar, notes (*Panorpa*).
1910. ENDERLEIN, Zool. Anzeiger, 35, p. 392. — Java (*Himanturella*).
1912. ENDERLEIN, Notes Leyden Mus., 34, p. 237. — Java, not seen (*Neopanorpa*).
1914. NAVÀS, Revue Russe d'Ent., 13, p. 430, fig. 8a-c (♂ abd.-structures). — ♂♀ PLASON, Sumatra (*Neopanorpa linguata*).
1915. PETERSEN, Entom. Meddel., 10, p. 231. — Cat., Java (*charpentieri*).
1921. PETERSEN, Cat. Coll. SELYS, Mecopt., p. 87-88 (pars !). — ♂♀ Java (*charpentieri*, partim).
1922. KARNY, Natur, 13, p. 203 fig. (♂ insect). — ♂ Mt. Gedeh.
1923. KARNY, Treubia, 3, p. 381-382, fig. (♂ insect). — Same specimen.
1933. LIEFTINCK, Verslag 14e Vergad. Afd. Ned. Oost Indië, 4, p. CXIX-CXX (biological notes). — Java (*charpentieri*).
1934. LIEFTINCK, De Trop. Natuur, 23, p. 69 - 70, notes on habits (*charpentieri*).

Material examined: — 2 males (both immature and in poor condition), labelled: LUDEKING, Ambarawa (Mid Java, Samarang res.), *cotype*, Cat. no. 3, *Panorpa nematogaster* MCLACHLAN, det. R. MCLACHLAN; and MÜLLER, Java, *cotype*, Cat. no. 2, *Panorpa nematogaster* MC LACHLAN, det. R. MCLACHLAN; both specimens in Museum Leiden. — 5 males, 2 females, W. Java, Poentjak pass, forest near Telagawarna, 1450 m, March 30, 1930 and Aug. 9, 1931, AUTHOR; 13 males, 13 females, W. Java, eastern slope of Mt. Gedeh, Tjibodas, 14 - 1500 m, Aug. 1921, 1923, H. H. KARNY, July 28 and Dec. 25, 1930, Aug. 9, 1931, and Jan. 2, 1936 AUTHOR, Sept. 8, 1931, T. VAN BENTHEM JUTTING, June 26, Dec. 28, 1933, L. J. TOXOPEUS, and May 22 - 23, 1935, J. VAN DER VECHT; 1 female, W. Java, northern slope of Mt. Panggerango, Tjisaroea Est., 1300 m, Dec. 2, 1934 AUTHOR; 9 males, 8 females, W. Java, western slope of Mt. Goentoer, Kamodjang, 1450 m, April 21, 1930, AUTHOR and May 1935, H. OVERBECK; 3 males, 5 females, W. Java, southern slope of Mt. Tangkoeban Prahoe, 1500 m, Sept. 10, 1929, Dec. 7, 1933, Jan. 4, 1934, F. C. DRESCHER; 6 males, 7 females, W. Java, western slope of Mt. Papandajan, 1600 m, Oct. 1934, EDW. JACOBSON; 1 male, W. Java, Mt. Malabar, 1500 m, Jan. 1936, EDW. JACOBSON.

West and Mid Java, 13 - 1600 m alt., and Sumatra.

♂♀ (adult). Body, with the exception of the rostrum, antennae, legs and intersegmental membranes of thoracic and proximal abdominal segments, wholly black, the abdomen usually with low metallic-green or blue shine.

Rostrum orange to orange-rufous, with a longitudinal amber-brown stripe over the entire length in front; this stripe sometimes effaced, but usually rather well delimited, occasionally very dark brown. Palpi orangish, last joint of maxillaries blackish at tip. Antennae dark brown, second and base of third joint a little paler. Head shiny black. Prothorax black.

♂♀ (juv.-ad.). Colouring of meso- and metathorax variable, according to age and maturity. In very old specimens the thorax is entirely black, while only the anterior surfaces of the first pair of coxae are pale in colour. Individuals of slightly younger age have the thoracic sides, including most of the coxae chestnut-brown, and indistinct cinnamon-rufous spots upon the back. Lastly, in juvenile specimens, the whole of the thorax is ochraceous-buff or flesh-coloured, only the mesonotum being darkened in front, fading to cinnamon-rufous behind, and the hind border of metanotum black. Legs pale, ochraceous-orange to light ochraceous-buff. Outer sides of tibiae and tarsi slightly darker in old specimens, the last two joints of tarsi usually brownish.

Wings long and very narrow, evenly and but slightly widened after the middle, with apices narrower and more pointed than in *filicauda* or *longicauda;* membrane pale orange-yellow, much less intensively coloured than in *filicauda,* but darker than in *longicauda.* Pterostigma not well marked off, almost of the same tint. Wing-tips rarely somewhat smoky.

♂. Abdomen excessively slender, though scarcely twice longer than hind wings, segments very thin. Segm. 2 about as long as broad; 3 and 4 longer, 3 ca one and a half times longer than broad and scarcely shorter than 4; 4 twice longer than broad and of the same length as 5; 5 still narrower, about two and a half times longer than broad; 6 one and a half times longer than 5; 7 and 8 extremely slender, each ca one and a half times longer than 6, sometimes longer, 8 a little shorter than 7 or nearly of the same length; 9 shortly pedunculate, the stalked portion very narrow, a little variable in length but always shorter than the genital bulb, which is comparatively small. Dististyli long and very slender. Third abdominal tergite produced into a slender, cylindrical and curved process which, in side view, is distinctly hollowed out ventrally; in dorsal view it is widest at base, then slightly constricted, the apical half slender, club-shaped, slightly pilose; it reaches not beyond one-third of the length of segm. 4. The fourth tergite bears a quite distinct, rounded median tubercle, placed much before the middle of segment, which is clothed with short silvery hair.

Coloration of abdomen throughout steely black; apex of dorsal process of segm. 3, and segm. 7 - 8 sometimes with slight dark brown intermingling, distal half of distisyli also reddish-brown.

Outline of the branches of the hypandrium variable; usually the two lobes are rather roof-shaped and hence much projecting in side view, but sometimes they are rather more turned in a horizontal position, so as to appear narrow and lanceolate, less convex and less projecting in profile view; in fact each of

the lobes is rather broad after the middle and obliquely truncated apically. Appendages otherwise as described in the key and as shown in the figures.

♀. Similar to the male. Wings occasionally with smoky apices (in one specimen from Mt. Gedeh the proximal half of the pterostigmal region is darkly enfumed and the tips are also much darkened).

Abdomen throughout steely bluish black; intersegmental membranes whitish.

Genitalia: internal skeleton entirely different from any of the known species. Main portion of the chitinous body considerably enlarged, the median axis projecting far basad; laterally, the basal plates are strongly chitinised and also much larger than usual, almost as long as the medigynium. Distal plate situated nearer to the middle, decidedly expanded in a horizontal plane.

Size very variable. ♂ abd. + app. 19.5 - 26.2; fw. 12.5 - 15, hw. 11.3 - 13.6 mm. — ♂ Tjibodas and Kamodjang: segm. 1 - 6 7.5; 7 4.3; 8 4.1; 9 + dististyli 3.6 mm; fw. 12.5, hw. 11.3 mm (smallest specimens). ♂ Tjibodas and Mt. Tangkoeban Prahoe: segm. 1 - 6 10.2; 7 5.8; 8 5.5; 9 + dististyli 4.7 mm; fw. 14.5 - 15, hw. 13.6 mm (largest specimens).

♀ abd. 9 - 10.6; fw. 12 - 14.4, hw. 11 - 13 mm.

Unfortunately, there is apparently much confusion about this species in literature. *L. nematogaster* was first described by MCLACHLAN after a ♀ captured by WALLACE somewhere in Java. In 1915, E. PETERSEN placed the species as a synonym of *Panorpa charpentieri* and in his monograph reports on it: "BURMEISTER on page 957 in his "Handbuch" says that he will describe a new species from Bengal; but in his description he only gives the vague locality "Ostindien". The only true localities known to me is Java and Sumatra, so I think the occurence of the species in Bengal to be rather doubtful" (loc. cit. p. 88).

In fact, BURMEISTER, on page 957 tells us that: "die Hallenser Sammlung besitzt davon [of the genus *Panorpa s. lat.*] 3 [species], und eine neue aus Bengalen; diese 4 werde ich aufführen". Then follow the diagnoses of the 3 known species, viz., *P. scorpio* FABR. (Süd-Karolina), *P. japonica* THUNB. (Japan) and *P. communis* L. (Europe), while on p. 958 the fourth member, *P. charpentieri* [new species!] is described by that author (from: "Ostindien; beide Geschlechter vom Herrn v. CHARPENTIER mitgetheilt").

We may therefore assume that BURMEISTER's *Panorpa Charpentieri* was from Bengal, for no other species was mentioned by him from continental Asia, "Ostindien" being clearly the general indication of a habitat referred to on the previous page of BURMEISTER's account.

PETERSEN's description in the monograph is very probably based on specimens of the true *nematogaster*, although no description of the ♂ appendages is given. Of BURMEISTER's types of *charpentieri* this author remarks: "the type-specimens of BURMEISTER are somewhat immature and smaller of size than the female from Brit. Mus.". The wings of the type ♂ of *charpentieri*, reproduced on p. 87, are very similar to those of *nematogaster*, but the sketches of the ♂ abdomen

and genital bulb (figs. 98 and 99, see fig. 9) differ considerably from our drawings of Javan *nematogaster* (cf. pls. 8 and 9). Although only a comparative examination of the internal genital structures of both sexes of *charpentieri* would give a decisive answer as to the status of that species, I am inclined to regard *charpentieri* specifically distinct from *nematogaster*, thus following VAN DER WEELE, ENDERLEIN and KARNY.

Dr. BLÖTE has kindly sent me two paratype males of *L. nematogaster* from Java, both identified as such by MC LACHLAN. Unfortunately these two males are in a very dilapidated state of preservation. The ♂ collected by S. MÜLLER is a juvenile specimen with its terminal segments lost. The specimen from Ambarawa is also very immature, the abdomen being shrivelled and the genitalia distorted; this may possibly explain the greatly dissimilar structure of the internal genital apparatus, which in this specimen is shown in an unnatural position, the ventral valves of the aedeagus being twisted so much that the lateral surfaces are turned ventrad, being in the form of horizontally expanded blades, thus differing widely from those of a fully mature specimen from West Java (cf. pl. 11, figs.).

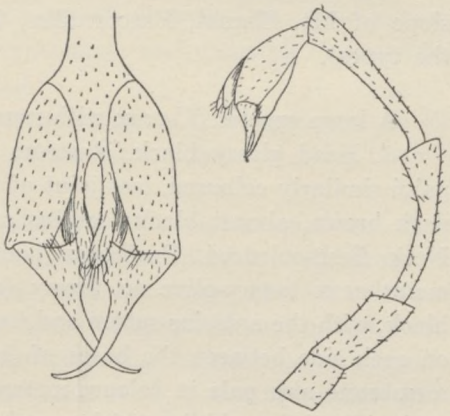


Fig. 9. — *Leptopanorpa charpentieri* (BURM.) T y p e. Ventral view of ♂ genital bulb and distal portion of abdomen. (After ESB. PETERSEN, 1921).

In the shape of their wings, and in the body-markings, these teneral individuals are exactly alike specimens from West Java, but since Ambarawa — only at 524 meters above sea-level! — is situated in cultivated country at the foot of Mt. Oengaran, it is very likely that LUDEKING's specimen came from that mountain. More material of Mt. Oengaran is urgently needed to answer the question as to whether MCLACHLAN's insect represents a distinct species or not.

ESBEN PETERSEN has examined NAVÀS's types of *Neopanorpa linguata* of Sumatra, which he found to be conspecific with *L. nematogaster*. This is the only record of it for Sumatra.

As has been pointed out by VAN DER WEELE (loc. cit., 1910, p. 200), *L. nematogaster* is a very variable species. The coloration of the thoracic segments is entirely dependent on the degree of maturity of the imago, though differences in the length of the last abdominal segments in specimens of similar size, seem to depend largely on soil- and food-conditions, in both sexes. The species is easily distinguished from its congeners by the excessive slenderness of the shiny black body, and by the genital organs and wings. *L. nematogaster* is one of the least rare members of the genus, occurring sometimes in large numbers in suitable places. Some remarks on the habits and food are to be found in the author's previous paper (1934), and on pp. 286 - 287. KARNY's drawing of the

♂ of this graceful insect (after a pinned specimen) gives a good general impression of this species.

Leptopanorpa robusta, sp. n. (Pls. 5, 8, 9, 12 and 14).

Material examined: — 9 males, 3 females, Central Java, southern slope of Mt. Slamat, Batoerraden, 950 m, Oct. 21, 1933, AUTHOR (including the types).

A large species. Thorax with much pale colouring, abdomen entirely black.

♂. Head glossy black. Rostrum ferruginous, paler aside and underneath; palpi similarly coloured, last joint of maxillary palpi darkened at tip. Antennae dark brown, almost black; torulus and first two joints pale brownish yellow. Neck flesh-coloured. Prothorax blackish brown, or black, lustreless. Meso-metathorax tawny-olive to tawny (discoloured), dorsum clearer. Mesonotum black, with the anterior suture and two large and sharply defined roundish spots on each side between the bases of front wings, cinnamon-buff; intersegmental membrane also pale in colour; metanotum with two similar, roundish spots on each side of the middle, which remains narrowly black, and with the projecting hind margin likewise pale at base, bordered with black behind. Sides cinnamon-buff, or tawny, metapleurae and coxae of posterior pair of legs very dark brown or black.

Legs including the coxae of first two pairs, ochraceous-buff; outer sides of tibiae and last three jounts of tarsi a little darkened.

Wings comparatively broad, with well rounded apices; membrane strongly tinged with pale orange-yellow, this tint slightly deeper than in *nematogaster*. Markings reduced, variable in extent, cinnamon- to mummy-brown. Front wing at least with very narrow, slightly oblique, diffuse brownish pterostigmal band; this fascia effaced posteriorly. Hind wing unmarked, pterostigma not or hardly deeper in colour than the membrane. Front wing at a maximum with complete, irregular, pterostigmal band and with two small, isolated, dark spots between M_2-M_3, and M_3-M_4 close to the wing margin (the remains of a posterior fork); hind wing at a maximum with similar, though narrow, pterostigmal fascia, which is curved somewhat basad, effaced posteriorly, terminating at M_4.

Abdomen rather robust, slightly less than twice the length of hind wing; segm. 1 - 6 gradually narrowed to behind, 7 and 8 long and very slender. Segm. 2 a little broader than long; 3 to 5 equal in length, 3 longer than broad and almost one and a half times longer than 2; 4 narrower, nearly one and a half times longer than broad; 5 short and narrow, one and a half times longer than broad; 6 tubular, more than one and a half times longer than 5; 7 and 8 subequal in length, each about twice longer than 6; 9 shortly pedunculate, the stalked portion thick and evenly widened distally, much shorter than the genital bulb, which is considerably widened apically and of robust building. Forceps short and thick, tips strongly incurved. Third abdominal tergite produced into a slender, almost straight, cylindrical process, which in side view is but

little concave ventrally, apex furnished with backwardly directed blackish hair; in dorsal view it is scarcely widened towards apex, which is rounded and slightly clubbed; this process is somewhat shorter than half the length of segm. 4. The fourth tergite is of simple structure and devoid of any dorsal protuberances.

Coloration of abdomen deep black; segm. 1 - 6 with low metallic-green shine. Tips of dorsal process of segm. 3, appendages and dististyli dark reddish brown. Genitalia as described and figured.

♀. Head as in the opposite sex. Rostrum in two out of three specimens darker in front than in male, basal third dark reddish-brown, growing paler towards apex.

Wings similar in principle; pterostigmal fascia complete in front wings of all specimens and distal edge of pterostigma also filled in with brown in two females. Front wing in all specimens with two more or less confluent brown spots between M_{2-3} and M_{3-4}, close to the wing margin and a trapezoidal (submedian) spot of variable shape along Cu_1; one female has moreover a minute spot placed upon the middle of the stalk of R_{2-5} and two others have a similar spot upon $R_{4\ 5}$, just beyond the radial fork. In the distal portion of the front wing further spots are absent (one specimen), or there is a maximum of two confluent transverse spots between R_3 and M_1 (2 specimens).

Abdomen throughout steely bluish-black; intersegmental membranes pale.

Genitalia: internal skeleton with the median tube long and inflated basally; basal plate well developed, strongly chitinised, forming two rounded tubercle-like projections which are separated anteriorly by a shallow depression. Distal plate expanded horizontally, evenly widened to behind; medigynium long and broadly lanceolate, directed almost straight backwards and lying in a horizontal plane.

Size variable. ♂ abd. + app. 20.3 - 24.2; fw. 13.7 - 14.9, hw. 12.3 - 13.3 mm. — Segm. 1 - 6 8.2 - 9.5; 7 4.1 - 5; 8 4.1 - 5; 9 + dististyli 3.9 - 4.7 mm. ♀ abd. 7.9 (shrivelled), 9.9 or 10.1; fw. 11.8, 14.3, 14.8; hw. 10.3, 12.7, 13.5 mm.

By its spotted wings, absence of a dorsal tubercle on the middle of the fourth abdominal tergite, and by the very robust pear-shaped genital bulb, this large and handsome species is easily distinguished from other black-bodied members of the genus.

Few specimens only were found in damp places of the forest, keeping company with *L. pi decorata* m.

Leptopanorpa erythrura, sp. n. (Textfig. 6, pls. 4, 7, 9, 12 and 14).

1933. Lieftinck, Verslag 14e Vergad. Afd. Ned. Oost Indië, 4, p. CXIX-CXX (biological notes). — Java (*nom. nud.*).

1934. Lieftinck, De Trop. Natuur, 23, p. 65 fig. 2 (♂ insect). — W. Java (*nom. nud.*).

1935. Handschin, Revue Suisse Zool., 42, p. 708. — W. Java (Lieft. *in litt.*).

Material examined: — 15 males, 12 females, W. Java, northern slope of Mt. Panggerango-Gedeh, Tjisaroea Est., 1000 - 13000 m, Aug. 10 and

Dec. 14, 1930, Jan. 11 (ED. HANDSCHIN and AUTHOR), July 19, Oct. 11 and Nov. 1, 1931; Sept. 15, 1933; Febr. 28 and Dec. 2, 1934; all AUTHOR coll. 1 male, W. Java, southern slope of Mt. Megamendoeng, 1000 m, Nov. 1, 1931, AUTHOR. 22 males, 20 females, W. Java, Mt. Bèsèr, near Tjiandjoer, 1250 m, Aug. 30, Sept. 30, 1934 and March 16, 1936, H. R. A. MULLER and AUTHOR. — Holotype ♂ and allotype ♀: Mt. Panggerango, Tjisaroea, 1100 m, Jan. 11, 1931, AUTHOR.

West Java, 10 - 1300 m.

A very distinct species, characterized by its short and thick-set abdomen, by its pale colours, and by its narrow wings.

♂. Head shiny black. Rostrum flesh-ocher to rufous, usually rather darkened in front, especially over the basal half, chestnut-brown, limits indistinct. Palpi similar in colour, maxillaries with the last joint darkened at tip. Antennae very dark brown, torulus and first joint pale yellow, second and base of third joints rather reddish. Thorax light ochraceous-buff to flesh-ocher. Anterior lobe of prothorax broadly margined with black and mesonotum also dark brown or black, adorned with two large, roundish pale spots, placed on each side between the bases of front wings. Metanotum with the middle portion and the carinae only black, so that two similar pale side-spots, placed between the bases of hind wings, are surrounded by black. Metascutum cinnamon-rufous, darkened posteriorly.

Legs, including the coxae, light ochraceous-salmon or light buff, outer sides of tibiae and apical joints of tarsi a little darker.

Wings narrow, evenly widened distally, apices rather pointed; membrane, though strongly tinged with pale yellow-orange, less intensively coloured than in *robusta*. Markings reduced, dark and opaque, mummy-brown in colour, restricted to the pterostigmal area. Front wing at least with the proximal two-thirds of the pterostigma filled in with brown; this wing at a maximum with the distal edge of the pterostigma also filled in with brown and with a narrow, irregularly triangular, postero-basal prolongation, which ceases at the common stalk of M_{1-2} or enters the first cell between M_{2-3} (in most specimens this basal off-shoot is poorly developed and very often altogether wanting). In a few specimens there are, in addition, two very small submedian spots, one in the fork between R_1 and R_{2-5} and one between Cu_1 and Cu_2. Hind wing at least with the proximal two-thirds of pterostigma brown, this spot often slightly projecting inward but never surpassing R_5.

Abdomen stout and of compact build, from 3.3 to only 1 mm longer than hind wing and sometimes of the same length as front wing (specimens from Mt. Bèsèr). Segm. 2 about 1½ times broader than long, 3 a little longer and likewise broader than long; 4 and 5 short, subequal in length, each less than 1½ times longer than broad (about twice longer than segm. 2); 6 about twice longer than 5, and only three times longer than broad; 7 and 8 short and comparatively thick, each but little longer than 6, their narrowest point lying

at extreme base; 9 sessile, or with a very short stalk, genital bulb large and very thick, widest at middle. Dististyli rather short, though slenderly built, incurved at apices. Third abdominal tergite produced into a slender, slightly curved, cylindrical process, which in side view is widest at middle, then rather concave ventrally, the apex furnished with a bunch of backwardly directed, ferruginous hairs; in dorsal view it is very slender, not or scarcely widened towards apex, which is rounded; this process is ca. half so long as segm. 4, or a trace longer, but does not extend beyond the middle of that segment. The fourth tergite bears a strong knob-like protuberance upon mid-dorsum, placed just before the middle of segment.

Coloration of abdomen pale. In well preserved specimens the tergites of segm. 1 - 5 are progressively lighter, amber brown or hazel on segm. 2 and 3, turning to cinnamon-rufous on 4 and 5; the sternites of these segments are apricot-buff or flesh-ocher. There is a well marked deep black streak on each side along hind margin of segm. 3, and the dorsal tubercle of 4 is slightly brownish above. The segments 6 to 9 are lighter and more vividly coloured than the preceding ones: throughout apricot-orange, or rufous, with no dark markings other than a deep black streak, one on each side, bordering the posterior margin of 6, 7 and 8, and the whole of the hypandrium of segm. 9, which, accordingly, is quite conspicuous. The branches of the hypandrium are in the form of much projecting, and strongly vaulted, golfstick -shaped processes. Epiandrium and dististyli rufous. Genitalia otherwise as described earlier and as appears from the figures.

♀. Head and thorax coloured as in the opposite sex. Rostrum usually darker in front than in the male, chestnut-brown above and pale yellow below in the majority of specimens.

Wings similar, but markings generally more extensive; these at least similarly developed as in heavily marked males, and always with a small brown spot in the fork between R_1 and R_{2-5} of front wing; the maximum development of wing-markings is shown on pl. 4.

Abdomen with the tergites of segm. 2 - 6 throughout steely greenish-black and with the sternites of these segments light buff to flesh-ocher. Segm. 7 - 10, with the exception of the ninth tergite, which is *black*, throughout apricot-orange or rufous. Appendages black, slightly darkened at base.

Genitalia: internal skeleton with the median tube strongly developed, subcylindrical in form; proximal portion with a robust subtriangular lateral cone which is directed slightly ventrad. Basal and distal plates weakly chitinized, merging into one another and evenly curved in a horizontal plane; medigynium broadly lanceolate, twisted on itself and extending backwards in a vertical plane, with slightly outcurved tips.

Size variable. ♂ abd. + app. 11.5 - 15.8; fw. 11.6 - 14, hw. 10.5 - 12.4 mm. — Segm. 1 - 6 5 - 6.2; 7 2.1 - 3.1; 8 2 - 3; 9 + dististyli 2.4 - 3.5 mm.

♀ abd. 7 - 9.2; fw. 11.3 - 14; hw. 10.2 - 13 mm.

Locally abundant in dense jungle, forming large colonies in the dampest places of the forest. An easily recognized species, distinguished from all others by the thick-set and rather short abdomen, and by its conspicuous, delicate colours. The male is at a glance distinguished from its congeners by the deep black genital valves which contrast so strikingly with the reddish tint of the bulb.

Leptopanorpa inconspicua, sp. n. (Pls. 4, 8, 9, 12 and 14).

Material examined: — 2 males (ad.), 1 female (slightly juv.), W. Java, Djampang distr., Soekanegara, ca. 1100 m, Dec. 26, 1931, in damp forest, AUTHOR (including the types).

A small, darkly coloured species, with short abdomen and narrow wings.

♂. Head shiny black. Rostrum dark in front, mars-brown, fading to cinnamon-rufous aside and underneath, base light ochraceous-buff below. Palpi cinnamon-rufous, last joint of maxillary palpi darkened at tip. Antennae blackish-brown, torulus and first joint light buff. Neck also pale in colour.

Prothorax black, side-margins paler. Ground-colour of meso-metathorax russet to cinnamon-brown (colours faded); sides unmarked, except two pairs of blackish points on meso- and metapleurae, and the posterior half of third pair of coxae, which are dark brown. Meso- and metanotum with the sutures and two pairs of large roundish spots (placed on either side between the bases of the wings, and very similar to *erythrura*), cinnamon-brown; metascutum black.

Legs, including first two pairs of coxae and most of the posterior pair, dirty ochraceous-tawny. Last three tarsal joints slightly darkened apically.

Wings narrow, evenly widened, tips rather pointed, similar in outline to *erythrura;* membrane strongly tinged with pale yellow-orange (also much as in *erythrura*). Markings reduced, cinnamon- to chestnut-brown, restricted to the pterostigmal area and continued obliquely inward to the middle of the wing (pl. 4), or only the proximal ¾ of the pterostigma filled in with brown (paratype). In the front wings of both males a minute brownish spot is present in the space between the fork of R_1 and R_{2-5}; for the rest the wings are unmarked in the paratype specimen.

Abdomen short and compact, similar in shape to *erythrura,* but segments 6 - 8 comparatively shorter. Segm. 2 and 3 subequal in length, about as long as broad; 4 and 5 a little longer than broad, both of the same length and longer than 2 and 3; 6 short, about 1½ times or slightly more longer than 5 and about twice longer than broad; 7 and 8 short but rather slender, less abruptly widened after the base than in *erythrura,* 8 a little shorter than 7; 9 almost sessile or very shortly stalked, genital bulb greatly developed, broadly ovate in outline and much swollen. Dististyli rather short, broad at base, distal halves slender and evenly curved inwards. Third abdominal tergite produced into a slender, hardly curved, cylindrical process, which in side view is a little concave ventrally, the concavity lying much beyond the middle of

its length; apex rounded, furnished with a bunch of backwardly directed blackish hairs; in dorsal view the process is narrow and not widened distally, reaching to slightly over the middle of segm. 4. The fourth tergite bears a strong knob-like mid-dorsal protuberance, situated immediately before the middle of the segment.

Coloration of abdomen steely black, with slight greenish lustre. The visible part of segm. 1 pale in colour, and distal half of dististyli ferruginous. Genitalia as described earlier and shaped as in the figures.

♀ (juv.). Very similar to the male. All colours a little paler. Wing-membrane slightly yellowish. Markings better developed. Front wing with complete, though narrow, irregular pterostigmal fascia, two distinct brown submedian spots (one in the spaces between Sc-R_1, R_2-R_5 and R_{2-5}-M, and an elongate spot between Cu_1 and Cu_2), a confluent spot between M_2 and M_4 close to the wing-margin, and a point between R_3 and R_4 at level of the end of R_1. Hind wing with complete pterostigmal fascia almost identical in shape, and with a vestige of a spot between Cu_1 and Cu_2.

Abdomen with the tergites of all segments steely greenish-black; sternites of segm. 2 - 5 dark brown, with greenish lustre; remainder discoloured.

Genitalia: internal skeleton very similar to that of the preceding species but of heavier build and with the fused basal and distal plates more strongly chitinized. Proximal end of the median tube with three indistinct knob-like tubercles, but without any indication of lateral processes. Medigynium evenly twisted, very slender apically.

♂ abd. + app. 13.2 - 13.5; fw. 12, hw. 11 mm. — Segm. 1 - 6 5.6 - 5.8; 7 2.6 - 2.7; 8 2.3 - 2.4; 9 + dististyli 2.6 - 2.7 mm.

♀ abd. 6.3 (shrivelled); fw. 12.2; hw. 11.3 mm.

Leptopanorpa jacobsoni (van der Weele) (Pl. 4).

1909. Van der Weele, Notes Leyden Mus., 31, p. 10-11 fig. 5-6 (♂ genital bulb and apps.), pl. 1 fig. 4 (♂ insect). — ♂ Jacobson, Mt. Oengaran (*Panorpa*).
1913. Petersen, Ibid., 35, p. 228. — No description; ♂ Jacobson, Mt. Oengaran.
1915. Petersen, Entom. Meddel., 10, p. 231, cat. no. 8.
1921. Petersen, Cat. Coll. Selys, *Mecoptera*, p. 89. — ♂ described (no locality given).

Material examined: — 1 ♂ (sub-adult, abd.-segm. 7 - 10 missing, labelled: "E. Jacobson, Goenoeng Oengaran, Java, Sept. 1910" (printed), "*Leptopanorpa jacobsoni* Weele ♂, det. Esb. Petersen", in Mus. Leiden.

Of this fine and very distinct species only three males are known. The type was discovered by Jacobson on Mt. Oengaran as early as in October, 1905, and is still in the Leiden Museum collection. Of the two other specimens, both topotypical and captured five years later by the same collector, one is in Petersen's collection and the second one in the Leiden Museum. It has been my privilege to examine one of these, which, unfortunately, lacks part of the abdomen so that no discussion and figures of the genital organs can be added to my description. The terminal segments, however, are well figured by van

DER WEELE and the sketches published by him agree very well with an outline drawing of the genital bulb of the type, made for me by Dr. H. C. BLÖTE, so that only the internal genitalia remain to be studied.

L. jacobsoni differs from all other known species by the yellow thorax and the black abdomen, which, together with the presence of a well defined apical band of the wings, are sufficient characters in discriminating the species from its allies.

The incomplete specimen, now before me, may be described as follows.

♂ (not fully ad., plesiotype). Head shiny reddish-black, with an indistinct reddish spot on each side along the eye-margin. Rostrum long and slim, with a longitudinal, glossy amber-brown stripe in front, shading to ferruginous and ochraceous-buff aside; below also pale in colour. Palpi orangish, distal half of last maxillary joint brown. Antennae dark brown; first two joints cinnamon-coloured, each with a blackish spot in front.

Prothorax brownish black, the posterior lobe orange-yellow and an indistinct median spot brownish. Thorax throughout deep chrome, anterior coxae and a small area below mesonotum pale orange-yellow. Anterior half of mesonotum Sanford's brown, turning paler behind.

Legs pale orange-yellow, apices of first tarsal joints and last two joints entirely, brownish.

Wings long, evenly and strongly widened after the middle (widest at the end of pterostigma), apices rather suddenly narrowed and finally somewhat pointed; membrane pale orange-yellow, this tint deepened at base and in the pterostigmal area; unmarked, except a well defined cinnamon-brown apical band whose inner margin is straight.

Abdomen slender, evenly narrowed to behind; shape of the existing segments unimpaired: 2 as long as broad; 3 almost 1½ times longer than 2 and as much longer than broad; 4 and 5 subequal in length, slightly longer than 3 and each about twice longer than broad; 6 long and tubular, amply 1½ times longer than 5. Remainder of segments missing. The process of the third abdominal tergite very similar in shape to *nematogaster*, though less curved as seen from aside and still broader at base in dorsal aspect; the apex is distinctly clubbed and provided below with short blackish hairs. Dorsal protuberance of segm. 4 small but quite distinct, situated much before the middle of segment.

Coloration of abdomen throughout steely greenish-black.

In the type the 7th and 8th abdominal segments are said to be relatively shorter than in *nematogaster*, the 9th segment being somewhat shorter pedunculate and narrower, with the tips of the dististyli more strongly crossed. The genital valves (*brhyp*) are narrower and "acutely angulate" in side view. From VAN DER WEELE's photograph of the whole insect segm. 7 and 8 appear subequal in length and about 1½ times longer than 6. The genital bulb is narrow basally, then much widened, the greatest width lying at extreme end.

Our specimen differs from the type by its larger size and slightly paler colours, the dark colouring on the anterior half of mesonotum being still very indistinct.

Size apparently variable. ♂ (type) abdomen 20, fw. 11.5, hw. 11 mm (*sec* van der Weele). ♂ (plesiotype) abd.-segm. 1 - 6 10, fw. 14.5, hw. 13.5 mm. ♂ (Petersen's specimen) abdomen 25, fw. 15, hw. 13 mm (*sec* Petersen).

This species has much in common with *L. sarangana,* with which it is closely allied. The chief differences are given in the key to the species; the outline of the wings as well as their markings are very distinctive. From *L. nematogaster* our species differs by its robustness and pale thorax; it is at once distinguished from that species by the genital organs and by the shape and markings of the wings. The ♀ is unknown.

Leptopanorpa sarangana, sp. n. (Pls. 5, 8, 10, 13 and 14).

Material examined: — 2 males (one in poor condition), 4 females (ad.) East Java, Mt. Lawoe, Sarangan, 1350 m, Jan. 10, 1930, W. M. Docters van Leeuwen, and June, 1932, J. G. Betrem. — Holotype: ♂ Mt. Lawoe, Sarangan, 1350 m, June 1932, J. G. Betrem; allotype: ♀ topotypical, Jan. 10, 1930, W. M. Docters van Leeuwen.

Allied to *L. jacobsoni.*

♂ (ad., type, June 1932). Head glossy black. Rostrum orange in front, fading to ochraceous-orange or ochraceous-buff below; palpi tawny, tips of last joint brownish. First two antennal joints and base of third joint ochraceous-orange, slightly darkened at end; next joints very dark brown, apical joints again a little lighter.

Prothorax mummy-brown, almost black, posterior lobe rather russet.

Meso- and metathorax, inclusive of the legs, throughout ochraceous-orange; anterior border of mesonotum indistinctly russet, this tint soon fading away posteriorly; metascutum also darkened behind. Outer side of hind tibiae and last tarsal joints slightly brownish.

Wings broader and more widened at middle than in *jacobsoni,* apices rather rounded; membrane pale orange-yellow, basal third of the wings more intensively coloured so. Front and hind wings with a sharply delimited, wedge-shaped, mummy-brown pterostigmal band; this is widest anteriorly, filling up the entire pterostigmal area, then tapers rapidly toward the opposite side of the wing, terminating at M_4 in front wing and at the fork of M_{1-2} in hind wing. The inner and outer limits of this spot are regularly convex, so that they are rather triangularly pointed to behind. Apices of both front and hind wings with a sharply defined, very oblique, mummy-brown spot, the inner margin of which is nearly straight, forming almost a straight angle with the outer margin of the pterostigmal fascia, from which it is separated along margin by a narrow space.

Abdomen slender, shaped much as in *jacobsoni,* 1½ times longer than hind wing; basal segments somewhat slenderer, progressively longer to behind: 2 a little broader than long; 3 somewhat longer than broad; 4 very little longer than 3 but 1½ times longer than broad; 5 distinctly longer than 4 and about

2½ times longer than broad; 6 tubular, almost 1½ times longer than 5; 7 and 8 very slender, 7 less than 1½ times longer than 6 and a little longer than 8; 9 shortly but distinctly pedunculate, the stalk much shorter than genital bulb, which is rather broad and evenly widened to behind. Branches of ventral appendages projecting and strongly hollowed out in their distal part, longer than genital bulb. Genitalia otherwise as described earlier. Dorsal process of third abdominal tergite long, very slender, cylindrical; in side view it is almost straight above, but beneath a little excavated after the middle, with rounded tip bearing short reddish hairs; in dorsal view it is finger-like and very slender, lacking the basal widening as is seen in *jacobsoni*. This process reaches about half the length of segm. 4, which is provided with a stout, knob-like median tubercle, placed just before the middle of the segment.

Coloration throughout shiny black with slight steely green reflections. Tip of dorsal process of segm. 3, extreme base of segm. 9 and distal half of dististyli reddish.

♂ (paratype). This is a larger specimen, differing from the type only by the wing-markings, which are slightly more extensive: in the front wing the pterostigmal fascia is continued on to the posterior margin in a very irregular manner, and the apical spot touches the pterostigmal one along anterior margin of hind wing (pl. 5). Most of the abdomen is wanting.

♀. This sex differs from the male in that the rostrum is entirely orange; in one (alcoholic) specimen (allotype, Jan. 10, 1930) the thorax and legs also are bright orange, and the first antennal joint is not spotted with brown anteriorly.

Wings shaped and tinged as in the male; arrangement of dark markings quite similar in principle. In all specimens the pterostigmal band is c o m p l e t e and but slightly indented or constricted on middle; its posterior portion narrower and with parallel sides. The apical spot is not different in shape from the male in the hind wings, but in the front wings of two specimens, including the allotype, this band is at first rectangulate and then curves outwards, ceasing at the point where R_5 reaches the wing-margin.

Abdomen unicolorous black, all segments with metallic-green shine.

Genitalia: internal skeleton with the median tube reduced and somewhat similar in shape to that of *filicauda* and *longicauda*. Basal plate greatly developed and strongly chitinised, extending proximad well beyond the base of the median tube. Distal plate rather expanded laterally; medigynium slightly incurved and extending to behind in a horizontal plane.

Length variable. ♂ (type) abd. + app. 17.4, fw. 12.8, hw. 11.6 mm. Segm. 1 - 6 8; 7 3.3; 8 3; 9 + dististyli 3.1 mm. — ♂ (paratype) fw. 13, hw. 12 mm.

♀ abd. (shrivelled) 7, fw. 13, hw. 12 mm (allotype); fw. 11.5 - 12, hw. 10.3 - 11.3 mm (paratypes).

A handsome and very distinct species, peculiar by the rich red colour of the thorax, and by the sharply pronounced pattern of the wings.

Leptopanorpa pi pi (VAN DER WEELE) (Pls. 6, 8, 10 and 13).

1909. VAN DER WEELE, Notes Leyden Mus., 31, p. 8-9 fig. 3 (♂ apps.), pl. 1 fig. 3 (♀ insect). — ♂♀ JACOBSON, Mt. Oengaran (*Panorpa pi*).
1912. ENDERLEIN, Ibid., 34, p. 238 (key). — Java, not seen (*Campodotecnum pi*).
1913. PETERSEN, Ibid., 35, p. 229 (pars !). — No description; ♂ JACOBSON, Mt. Oengaran (*pi*).
1915. PETERSEN, Entom. Meddel., 10, p. 231, cat. no 10. — No description (*pi*).

Material examined: — 1 male (adult), labelled: "E. JACOBSON, Goenoeng Oengaran, Java, Sept. 1910 (printed), *Leptopanorpa pi* WEELE ♂" (in PETERSEN's handwriting), in Mus. Leiden.

The only specimens of the typical *pi*, described by VAN DER WEELE, are a pair in the Leiden Museum, captured by E. JACOBSON on Mt. Oengaran, in October 1905, and a topotypical male, likewise collected by JACOBSON, recorded by PETERSEN in 1913. The type is an immature specimen in poor condition, while PETERSEN's male, on which the following description is based, is fully adult, allowing a closer examination of structural details.

In the Selysian monograph of the *Mecoptera*, PETERSEN described a male from Nongkodjadjar, collected by JACOBSON, which is wrongly placed under this species; the specimen described there belongs to *L. peterseni* (see under that species).

♂ (adult, plesiotype, Mt. Oengaran). Head shiny black. Rostrum very dark in front, basal side-edges and under-surfaces ochraceous. Palpi ochraceous, last maxillary joint darkened. Basal half of antennae, including the first joints, almost black, distal half gradually a little lighter, auburn. Prothorax, except the lower anterior ridge and two indistinct pale spots along posterior margin, black. Ground-colour of meso-metathorax orange-buff, dorsum marked with black. Mesonotum dull black, with the sutures and two large roundish posterior spots, one on each side between the bases of front wings, orange-buff; metanotum likewise black, with two similar spots on each side and with the metascutum also lightly coloured along base. Sides, including the coxae, pale in colour with no other markings than two pairs of conspicuous black points on meso- and metepimerum.

Legs throughout pale orange-yellow; last tarsal joints slightly obscured.

Wings long and rather broad, evenly widened after the middle, apices rather rounded. Membrane almost clear; front and hind wings with sharply defined, strongly angulate, cinnamon-brown pterostigmal fascia, shaped as is shown on pl. 6, and with the apices of front wings distinctly smoky (tips of hind wings slightly so).

Abdomen almost 1½ times longer than hind wings. Segm. 2 - 6 progressively longer; 2 a little broader than long and slightly shorter than 3; 3 equally long and broad and slightly shorter than 4; 4 a little longer than broad and slightly shorter than 5; 5 about 1½ times longer than broad; 6 tubular, almost twice longer than 5 and three times longer than its greatest width; 7 and 8 very

slender, both less than 1½ times longer than segm. 6, 8 a little shorter than 7; 9 shortly pedunculate, genital bulb large, narrow at base, strongly widened distally. Third abdominal tergite produced into a slender, very little curved, cylindrical process, which in side view is a little shorter than half the length of segm. 4 and but slightly pilose; in dorsal view it is thin and not clubbed apically. The fourth tergite bears a distinct knob-like mid-dorsal protuberance, placed just before the middle of segment.

Abdomen dark in colour; segm. 2 - 6 steely black, remainder of segments very dark brownish black, extreme base of segm. 9 and distal halves of dististyli ferruginous. Genitalia as described in the key and as shown in the figures.

♀. A description of this sex has never been published, although VAN DER WEELE gave a photograph of it, and in this the wing-markings are well brought out. In the front wing the posterior branch of the π-shaped pterostigmal band is narrow and reaches the wing-margin; in the hind wings the posterior off-shoot is incomplete and pointed.

Only a single female has been made known, and I have been unable to examine the genital organs.

Type measurements: ♂ abdomen 15, fw. 12.5, hw. 11.5; ♀ abdomen 10, greatest width of front wing 3, idem of hind wing 2.75 mm (*sec* V. D. WEELE). Plesiotype ♂: abd. + app. 17.3; fw. 13.5, hw. 12 mm. — Segm. 1 - 6 7.4; 7 3.5; 8 3.1; 9 + dististyli 3.3 mm.

Leptopanorpa pi decorata, subsp. n. (Pls. 6, 8 and 10).

1934. LIEFTINCK, De Trop. Natuur, 23, p. 65 fig. 1 (♂ insect). — Mt. Slamat (*L. brachyura, nom. nud.*).

Material examined: — One male (ad.), Central Java, southern slope of Mt. Slamat, ca. 1000 m, Oct. 21, 1933, AUTHOR; taken in company with *L. robusta* m. — The specimen is the holotype.

The single specimen of this richly coloured insect looks quite different at first sight from typical *pi*, but a closer examination of the genital organs afforded no differences of sufficient importance to give it specific rank. Although of slightly smaller size and more compact build, the proportionate length of the separate abdominal segments were found to be approximately the same in the two insects compared; and as no differences in the colour-pattern of the body exist, the two forms are here regarded as races of but a single species.

Besides being smaller, *L. pi decorata* differs from the typical race by the ground-colour of the thorax being more obscured, and by the wing-markings, which are much more extensive. The following is a comparative description of the insect.

♂ (ad.). Rostrum shiny black, basal side-edges and beneath auburn. Basal half of antennae black, distal half gradually somewhat lighter. Ground-colour of meso- and metathorax obscurely tawny, coloured much as in *robusta;* black

pattern of meso- and metanotum not different from typical *pi*, the pale roundish spots rather obscured. Legs similar.

Wings not different in outline; membrane hyaline, markings as on pl. 6.

Abdomen less than 1½ times longer than hind wing. Ratio of segments similar to *pi*. Process of third abdominal tergite almost straight and slightly more thickened apically. Fourth tergite as in the typical race.

Coloration, except the middle of first segment (which is pale), throughout steely black. Apices of dististyli ferruginous. Genital bulb and appendages not appreciably different in structure. Internal genital organs identical.

Abd. + app. 14.5, fw. 12, hw. 10.2 mm. — Segm. 1 - 6 6.2; 7 2.8; 8 2.5; 9 + dististyli 3 mm.

♀. Unknown.

Leptopanorpa javanica (Westwood) (Pls. 6, 7, 10, 12 and 14).

1846. Westwood, Trans. Ent. Soc. London, 4, p. 186. — ♂♀ Java (*Panorpa*).
1852. Westwood, Ibid, 1 (ser. 2), p. 5. — ♂♀ Java (*Panorpa*).
1853. Walker, Cat. Neur. Brit. Mus., p. 460. — Java (*Panorpa*).
1909. Van der Weele, Notes Leyden Mus., 31, p. 6. — Short notes on ♂ Java & Sumatra in Brit. Mus. (*Panorpa*).
1910? Enderlein, Zool. Anzeiger, 35, p. 391. — ♂♀ N. E. Sumatra (*C. javanicum*, type of genus *Campodotecnum*).
1912. Enderlein, Notes Leyden Mus., 34, p. 236-237 (notes), 239 (key). — (*Campodotecnum javanicum*).
1913. Petersen, Notes Leyden Mus., 35, p. 229. — No description; ♂♀ Jacobson, Noesa Kambangan, Java.
1915. Petersen, Entom. Meddel., 10, p. 231, cat.-no. 9. — Java.
1921. Petersen, Cat. Coll. Selys, Mecoptera, p. 89-90 (*pars* ?), fig. 100 (wings ♂ Noesa Kambangan, Java). — ♀ ?Burma, ♀ ?Hainan, ♀ ?Sumatra; ♀ Horsfield, Java; ♂♀ Jacobson, Java).

Material examined: — 1 male, M. Java, Banjoemas, isle Noesa Kambangan, March 1911, E. Jacobson, labelled: *Leptopanorpa javanica* Westw. (in Petersen's hand); 2 females, M. Java, Semarang, no. 10, 1924 - 1928, "teak-forest", L. G. E. Kalshoven; 1 male, SW. Java, coastal forest around Sempoertjondong (Tjidaoen), 100 m, Sept. 5, 1935, Max Bartels Jr.

So far known restricted to the wooded lowlands of Southwest and Mid Java, and ? Sumatra.

♂♀. Body, with the exception of the rostrum, entirely black. Wings heavily marked.

♂. Head shiny black; rostrum comparatively long, ochraceous-orange, not darkened in front. Palpi also orangish, maxillaries with the distal half of the last joint brown. Antennae very dark brown, torulus and first joint pale yellow, second joint reddish at base. Pro- and synthorax unicolorous dull black; meso- and metapleurae with faint reddish-brown hue. Intersegmental membranes colourless.

Coxae dark reddish-black. Legs otherwise entirely ochraceous-buff, outer sides of tibiae and last tarsal joints slightly darker.

Wings broad, apices much rounded; membrane h y a l i n e. Markings well-developed, very extensive, cinnamon-brown in colour. Front and hind wings very similar to the figure on pl. 6 (♀), but with the pterostigmal and apical bands only narrowly confluent along costal margin; the hyaline marginal fenestra between the fork of the pterostigmal band in hind wing is equal in width to the basal off-shoot of this band, and o p e n (not bordered with brown) behind. In both pairs of wings the two hyaline spaces in the outer half of the wings, though transparent, are milky-white.

Abdomen stout but rather long, over one and a half times longer than wing. Segm. 2 a little broader than long; 3 somewhat longer than 2 and squarish; 4 hardly longer than 3 but a little longer than broad; 5 a little longer than 4 and fully 1½ times longer than broad; 6 tubular, about 1½ times longer than 5 and about three times longer than its width at base; 7 and 8 very slender, each a little less than 1½ times longer than 6, 8 somewhat shorter than 7; 9 shortly pedunculate, almost sessile, genital bulb large and rubust, widest apically. Dististyli very long, of slender build, slightly incurved at apices.

Third abdominal tergite produced into a slender, almost straight, cylindrical process, which is of equal width throughout, its swollen apex furnished with a bunch of very short, backwardly directed black hairs. In the specimen from Noesa Kambangan this process is a little shorter than half the length of segm. 4, but in our second male it is longer, reaching beyond the tubercle of segm. 4. The fourth tergite bears a distinct, knob-like protuberance, placed upon the middle of the segment.

Coloration of abdomen throughout shiny black with faint metallic-blue shine; intersegmental membranes between basal segments dirty ochreous. Dorsal appendage and dististyli dark reddish-brown. Epiandrium escutcheon-shaped with the apex slightly projecting at middle, but with rounded margin. Branches of the hypandrium convex, long and straight, sub-parallel, tips broadly rounded is ventral view. Genitalia otherwise as described earlier and as appears from the sketches.

♀. Head and thorax coloured as in the male. Rostrum of the same striking orangish tint. In one specimen the legs are a little darker.

Wing-markings much as in the male, though slightly more extensive, and not different in the two specimens. No milky-white fenestrae.

Genitalia: internal skeleton very short and comparatively broad. Basal plate in the form of two wing-like structures, which are rather twisted and turned dorsad; mesially the two portions converge and are connected with each other by a thin membrane. Distal plate well demarcated; medigynium closely apposed to the body-wall and not clearly delimited dorsally (pl. 14).

Length: ♂ abd. + app. 20.6; fw. 13.3, hw. 12 mm. — Segm. 1 - 6 9; 7 3.9; 8 3.7; 9 + dististyli 4 mm.

♀ abd. ca. 8.5; fw. 11.5 - 12.3; hw. 10.2 - 10.8 mm.

This interesting scorpion-fly is apparently the only one having essentially coastal habitations, avoiding the highlands. Although very local and obviously a rare species, *javanica* may turn up in various other districts of the southern and northern residencies of the island.

The two males agree closely with one another, but I am not quite certain about the females from Semarang, which may belong to a distinct species. The wings, of course, are like those of the males, but it is a common phenomenon among Panorpidae that those species inhabiting low country have the wings more strongly pigmented and more heavily marked than those of higher altitudes, and so we may expect two different species in low country with approximately the same wing-pattern.

From South Java — typical *javanica!* — I have only seen the male, whereas from the djati-forests along the northcoast only females are at present available; hence, it remains an open question whether or not the northern individuals belong to a different species. The wing-markings are indeed a little different in both sexes and therefore topotypical females of *javanica* are very needed in view of an examination of the genital organs and the internal skeleton, which alone can give a conclusive answer as to the stability of secondary characters, such as the pattern of the wings.

In our females *Smb* is complete and runs obliquely from R_1 to the end of Cu_2, while in the males *Smb* coalesces with a basal spot so as to form an extensive, longitudinal, brown streak in the cubital space of the wing, which appears to be a distinctive character of this species.

Leptopanorpa peterseni, sp. n. (Pls. 6, 7, 10, 13 and 14).

1921. Petersen, Cat. Coll. Selys, Mecoptera, p. 91 (*pars* ?). — ♂♀ Nongkodjadjar, Java described (*pi*).

Material examined: — 1 male (juv.), labelled: E. Jacobson, Java, Nongkodjadjar, Jan. 1911 (printed), *Leptopanorpa pi* Weele (in Petersen's hand), in Mus. Leiden. — 2 males, 1 female, E. Java, southern slope of Kendeng Mts. (Idjen Plateau), Blawan, 950 m and Kendeng III, 1400 m, June 1924, K. W. Dammerman. 6 males, 6 females, Idem, Blawan, 950 m, Nov. 19, 1933; Jan. 14 and Dec. 2, 1934; Jan. 27, Febr. 19 - March 16 and Dec., 1935, H. Lucht & L. J. Toxopeus. 4 males, 2 females, Idem, Sempol, 1200 m, Febr. 1934, E. Handschin. 18 males, 12 females, E. Java, southern slope of Idjen Mts. (Idjen Plateau), Mt. Raoeng, Bajoekidoel Est., ca. 5 - 700 m, May, Sept. 25 and Dec., 1932; April 29 and Dec. 8, 1933; Febr. 12 and March 9, 1934; H. Lucht. — Holotype ♂ and allotype ♀: Mt. Raoeng, Bajoekidoel, 5 - 700 m, Sept. 1932, H. Lucht. Paratypes (from Sempol) are in the collection of the Basle Museum, and topotypes (from Mt. Raoeng) are in Esb. Petersen's collection.

Confined to the submontane and montane tracts of East Java: north-western slope of Mt. Tengger (Nongkodjadjar, 1200 m), Mt. Idjen, Mt. Raoeng, 800 - 2000 m alt.

A very variable species, especially in its wing-markings.

♂♀. Body, with the exception of the rostrum, entirely black, or dark reddish-black. Wings at least with a brown pterostigmal fascia and smoky apices.

♂. Head glossy black; rostrum zinc-orange, ochraceous-orange, or ochraceous-tawny, not darkened in front. Palpi also pale, last joint of maxillary palpi brownish distally. Antennae blackish brown; torulus and first joint yellow, second joint also pale at base. Pro- and synthorax unicolorous dull black; meso- and metapleurae sometimes intermingled with reddish- or purplish-black. Intersegmental membranes usually clear yellowish (flesh-coloured in faded specimens).

Coxae black, or reddish black, only the distal extremity of them yellow. Legs otherwise pale in colour, light ochraceous-buff; tarsi gradually darkened towards the end, the last two joints rather more brownish (sometimes dark brown).

Wings rather broad with rounded apices, but narrower than in *javanica*, especially in their basal part; membrane sub-hyaline, but occasionally with greyish yellow suffusion all over it. Markings cinnamon-brown, extremely variable, as is demonstrated by our figures 4 - 6 on pl. 6. In most specimens (including the type), there is a broad pterostigmal band, which, usually, is more distinctly forked posteriorly in front wing than in the hind one, but in all heavily marked specimens this posterior off-shoot, if complete at all, is only very narrow. The apical band is variable to a similar extent and in none of the males the two spots are confluent along costal margin.

In the specimens from Nongkodjadjar (Mt. Tengger) and in four males from Mt. Raoeng the posterior fork of the pterostigmal band is absent altogether and the apical band is reduced to a tiny pale brown marginal whisk (pl. 6).

Abdomen rather robust and comparatively very short, extremely variable in length, from 1.3 to 1.8 times longer than hind wing, segm. 1 - 6 of the usual shape, gradually narrowed to behind, 7 and 8 slender, but comparatively much shorter than in most of the other species. Segm. 2 a little broader than long; 3 slightly longer than 2, squarish in dorsal view; 4 equal in length to 3 but slightly longer than broad; 5 rather short, longer than 4 and almost one and a half times longer than broad; 6 short and tubular, scarcely one-third longer than 5; 7 and 8 subequal in length, each about one-third longer than 6; 9 shortly pedunculate, the stalked portion thick and evenly widened distally, much shorter than the genital bulb, which is of slender build and only little widened apically. Dististyli long and slender, tips somewhat incurved. Third abdominal tergite produced into a slender, basally slightly downbent, cylindrical process, which in side view, after a slight thickening, is distinctly excavated ventrally; apex furnished with short, backwardly directed, blackish hair. The fourth tergite bears a strong, semicircular, mid-dorsal tubercle which, in side view, is placed slightly before to almost at middle of the segment.

Coloration of abdomen throughout shiny black, with the first six segments usually faintly bronzy or with slight bluish bloom; intersegmental membranes pale ochreous.

Epiandrium black, apical portion parallel-sided, almost rectangular, with rounded side-edges and very slightly produced, rounded apex. Branches of the hypandrium black, prominent. Dististyli dark blackish brown, apices chestnut-coloured. Genitalia otherwise as described earlier.

♀. Coloration of the body identical to the male. Thoracic sides in adult specimens always deep black. Wing-markings similar in principle to the opposite sex and equally variable. Front wings at least with a narrow, complete pterostigmal band, a brown streak between Cu_1 and Cu_2, and with the apex of the wing narrowly bordered with brown; hind wing at least as before but without a streak between the said veins. The markings of the darkest specimens are similar to those of the darkly coloured males, except that the distal branch of the pterostigmal band, though narrow, is complete in all wings, the apices then being entirely filled in with brown. All intergradations are represented in our material.

Genitalia: internal skeleton of very complex structure, the median tube reminding somewhat a skittle in general aspect and as seen from below. Proximal portion much thickened, the lateral tubercles well visible in ventral view. Basal plate not developed; distal plate expanded, separated from the medigynium by a well-marked constriction. Basal knob of the median tube connected with the distal plate by a thin membrane. Medigynium slenderly lanceolate, each a little incurved, not twisted. An outline drawing of the internal skeleton, as seen from the side, is given on pl. 14.

Length: ♂ abd. + app. 12.8 - 18; fw. 11 - 13.2, hw. 10 - 12.5 mm. — Segm. 1 - 6 5.9 - 8.1; 7 2.3 - 3.4; 8 2.1 - 3.2; 9 + dististyli 2.5 - 3.3 mm. The type measures: abd. + app. 17.3; segm. 1 - 6 8; 7 3.1; 8 2.9; 9 + dististyli 3.3 mm.

♀ abd. 9 - 10; fw. 11 - 13.5, hw. 10.5 - 12.2 mm.

This species is by no means rare but apparently restricted to a small area in the eastern part of the island. It inhabits thick forest in hilly country as well as the higher levelled mountain-slopes. The individuals from Sempol are among the smallest and in these the rod-like process on the dorsum of segm. 3 is most distinctly constricted before the apex, while the branches of the hypandrium are slightly longer and more elongate than in a number of equally small specimens from Bajoekidoel Estate, which is situated about 600 meters lower. In our series from Blawan however, all types are represented and all characters, except perhaps the internal genital organs appear to be unstable in this species. As stated before, the branches of the hypandrium may be different in shape and length: in some specimens they are rather blunt and do not project beyond the end of the genital bulb, while in others, besides being longer and more

slender, they are more or less pointed apically. Since the male genitalia of all the forms are identical, I am almost convinced that we are dealing with a single species.

All agree in having the rostrum comparatively very short; and the peculiar finger- or rod-like branch and tufts of barbs on the base of the dististyli are very constant and enable easy recognition of the species.

The wings of *peterseni* are subject to considerable variation and especially in our large series from the foot of Mt. Raoeng there are examples with heavily banded wings as well as some in which the wings are clearer and almost devoid of the original pattern.

I have named this fine species in honour of P. ESBEN PETERSEN, who has contributed so much to our knowledge of Oriental scorpion-flies.

EXPLANATION OF PLATE 4.

Fore and hind wings of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. filicauda, sp.n. ♂ (paratype), Mt. Kendang.

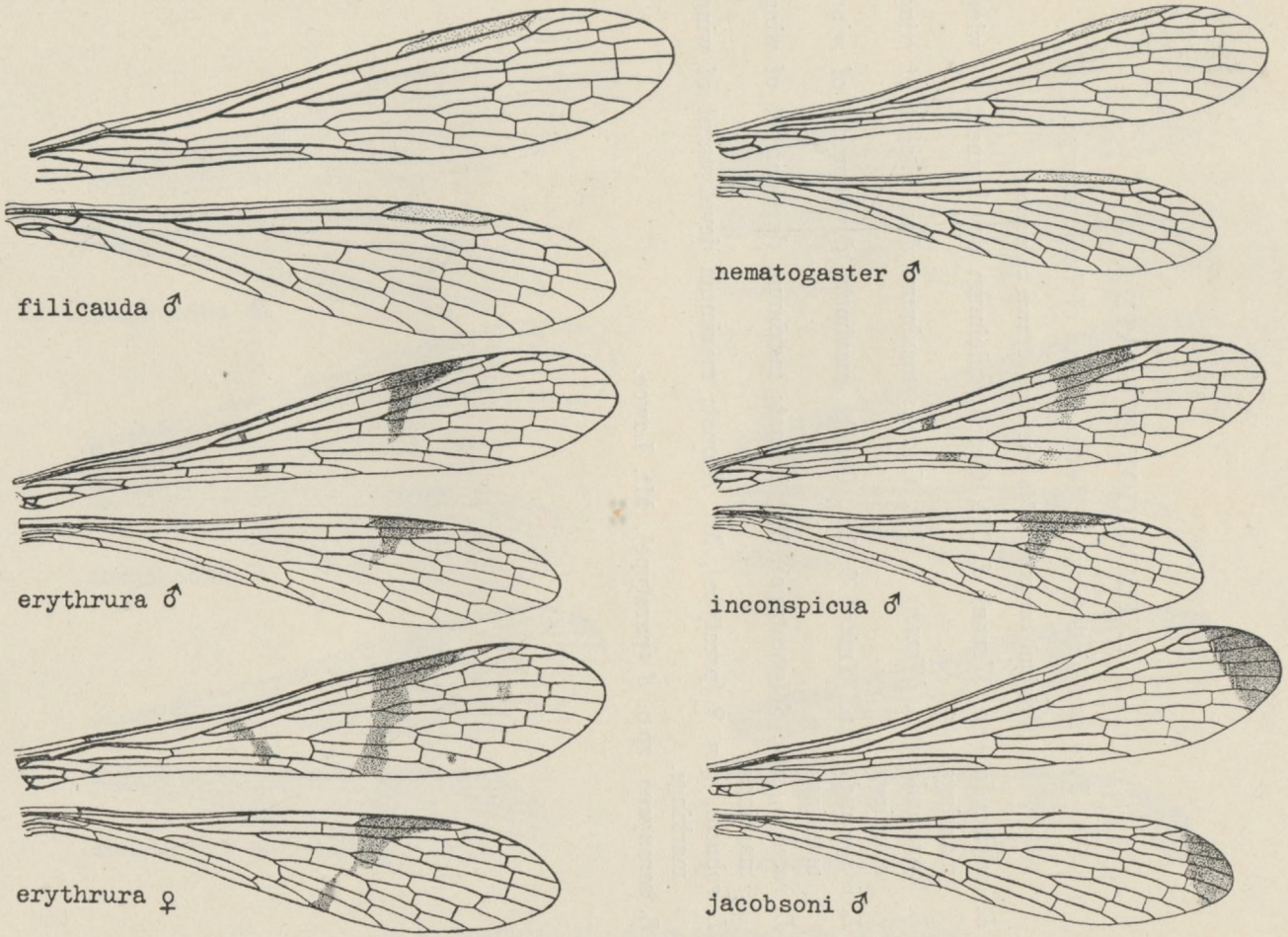
L. erythrura, sp.n. ♂ (paratype), Mt. Gedeh; maximum development of wing-markings.

L. erythrura, sp.n. ♀ (paratype), Mt. Gedeh; maximum development of wing-markings.

L. nematogaster (McLachlan) ♂, Mt. Goentoer.

L. inconspicua, sp.n. ♂ (holotype), Soekanegara; maximum development of wing-markings.

L. jacobsoni (v.d. Weele) ♂ (plesiotype), Mt. Oengaran.



M. A. Lieftinck: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 5.

Fore and hind wings of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. longicauda (v.d. Weele) ♂, Mt. Gedeh; minimum development of wing-markings.

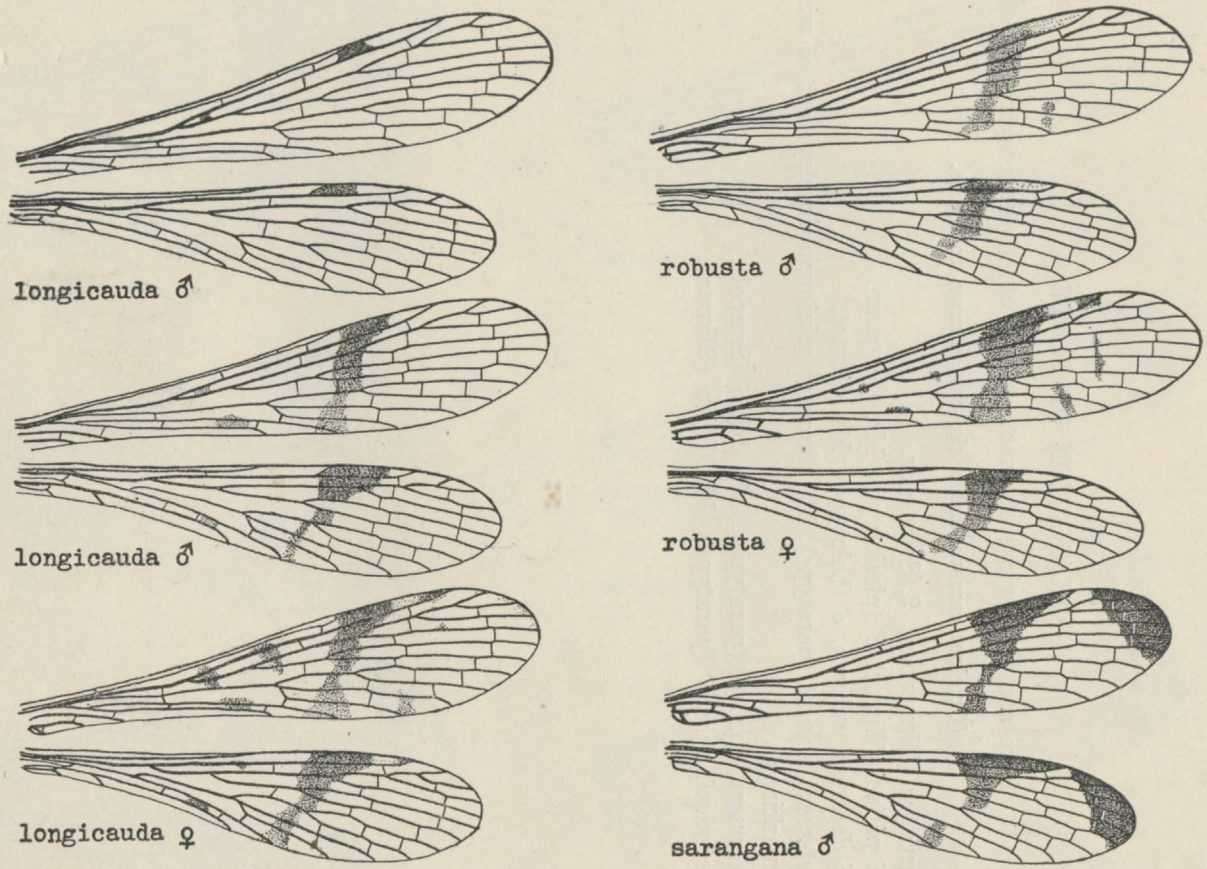
L. longicauda (v.d. Weele) ♂, Mt. Gedeh; maximum development of wing-markings.

L. longicauda (v.d. Weele) ♀, Mt. Gedeh; maximum development of wing-markings.

L. robusta, sp.n. ♂ (paratype), Mt. Slamat; maximum development of wing-markings.

L. robusta, sp.n. ♀ (paratype), Mt. Slamat; maximum development of wing-markings.

L. sarangana, sp.n. ♂ (paratype), Mt. Lawoe.



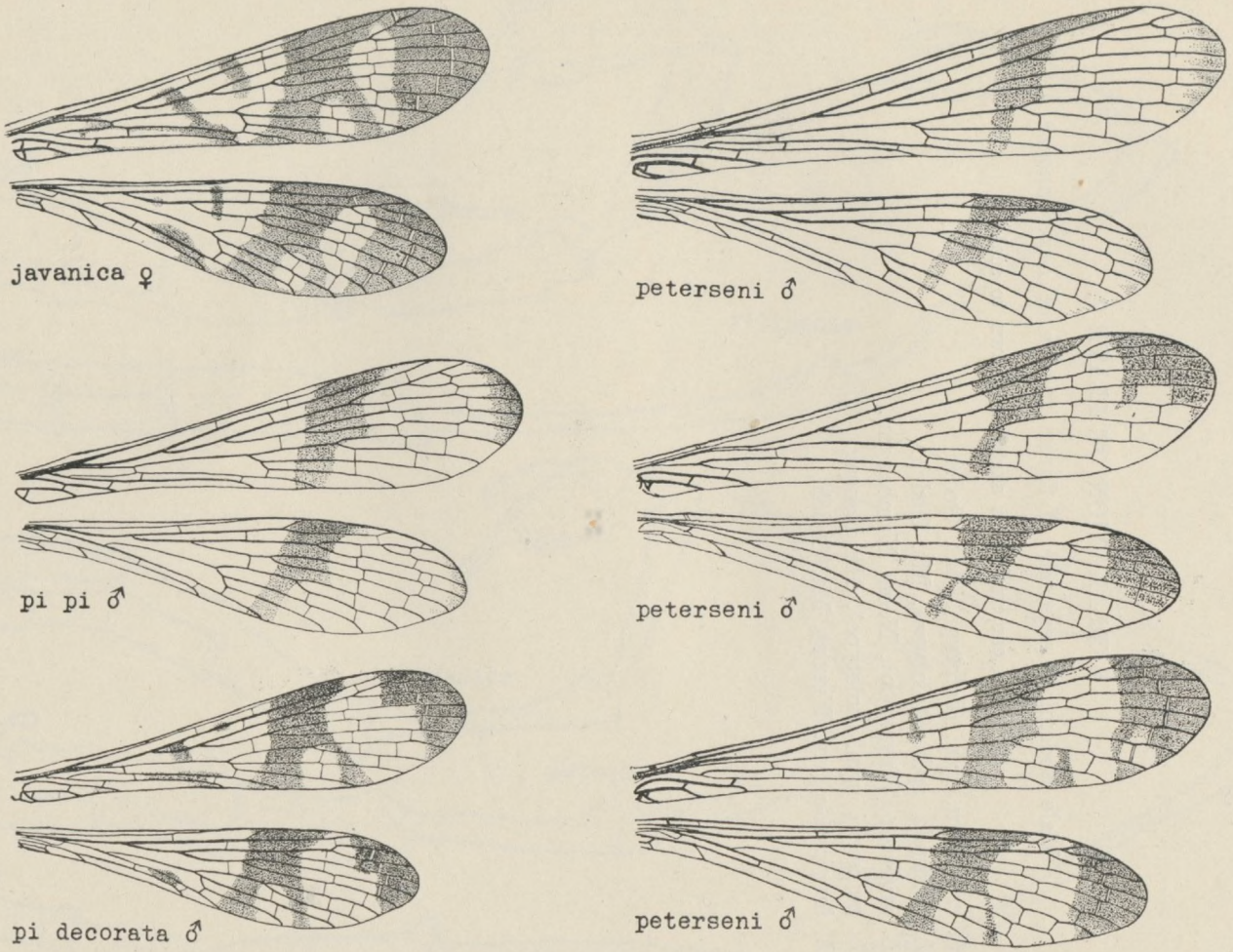
M. A. Lieftinck: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 6.

Fore and hind wings of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. javanica (WESTWOOD) ♀, Samarang.
L. pi pi (V.D. WEELE) ♂ (plesiotype), Mt. Oengaran.
L. pi decorata, subsp.n. ♂ (holotype), Mt. Slamat.
L. peterseni, sp.n. ♂ (paratype), Mt. Raoeng; minimum development of wing-markings.
L. peterseni, sp.n. ♂ (paratype), Mt. Idjen (Sempol).
L. peterseni, sp.n. ♂ (paratype), Mt. Idjen (Blawan).



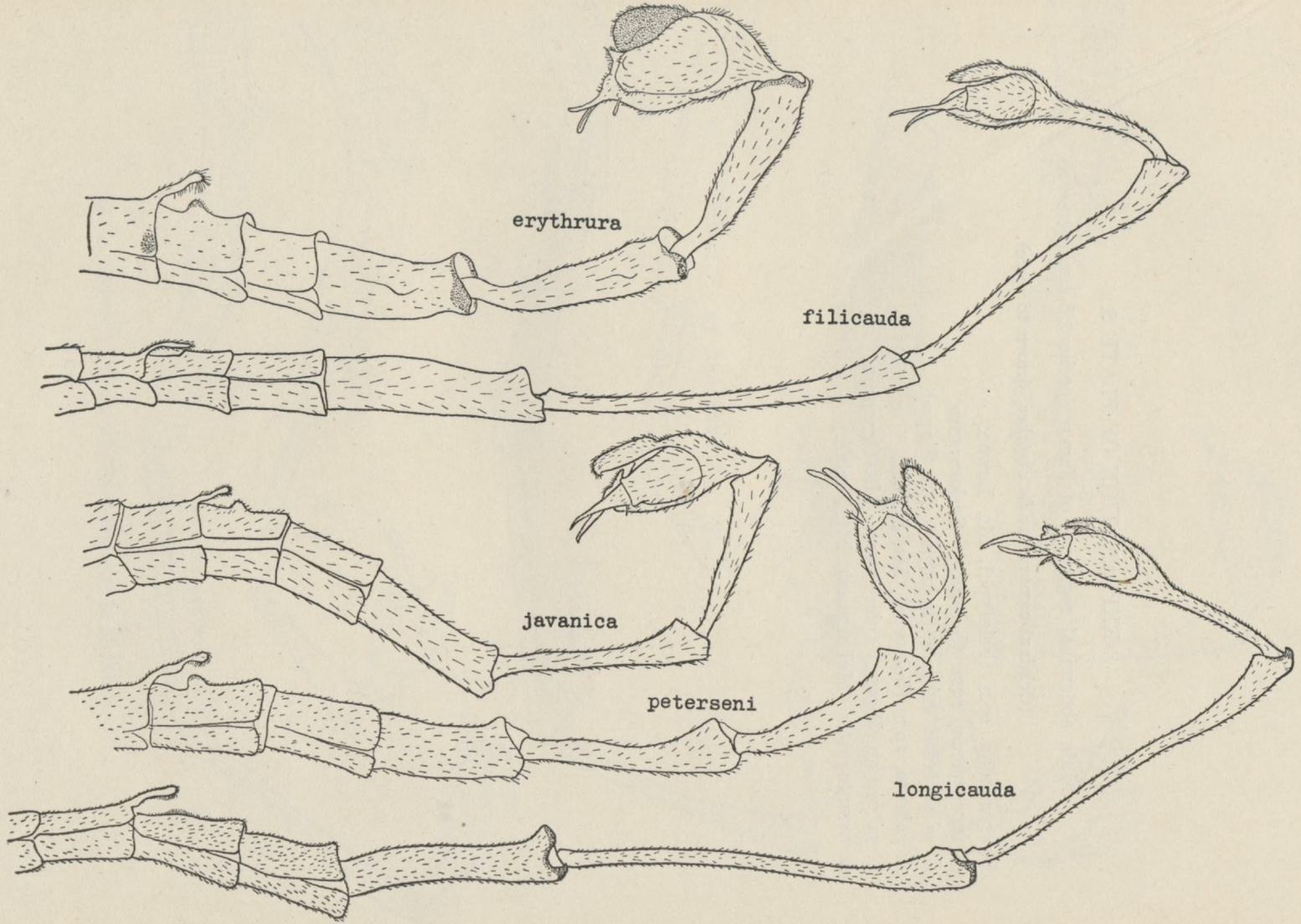
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 7.

Male abdominal segments of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. erythrura, sp.n. (holotype), Mt. Gedeh.
L. filicauda, sp.n. (holotype), Mt. Gedeh.
L. javanica (WESTWOOD), Noesa Kambangan.
L peterseni, sp.n. (holotype), Mt. Raoeng.
L. longicauda (V.D. WEELE), Mt. Gedeh.



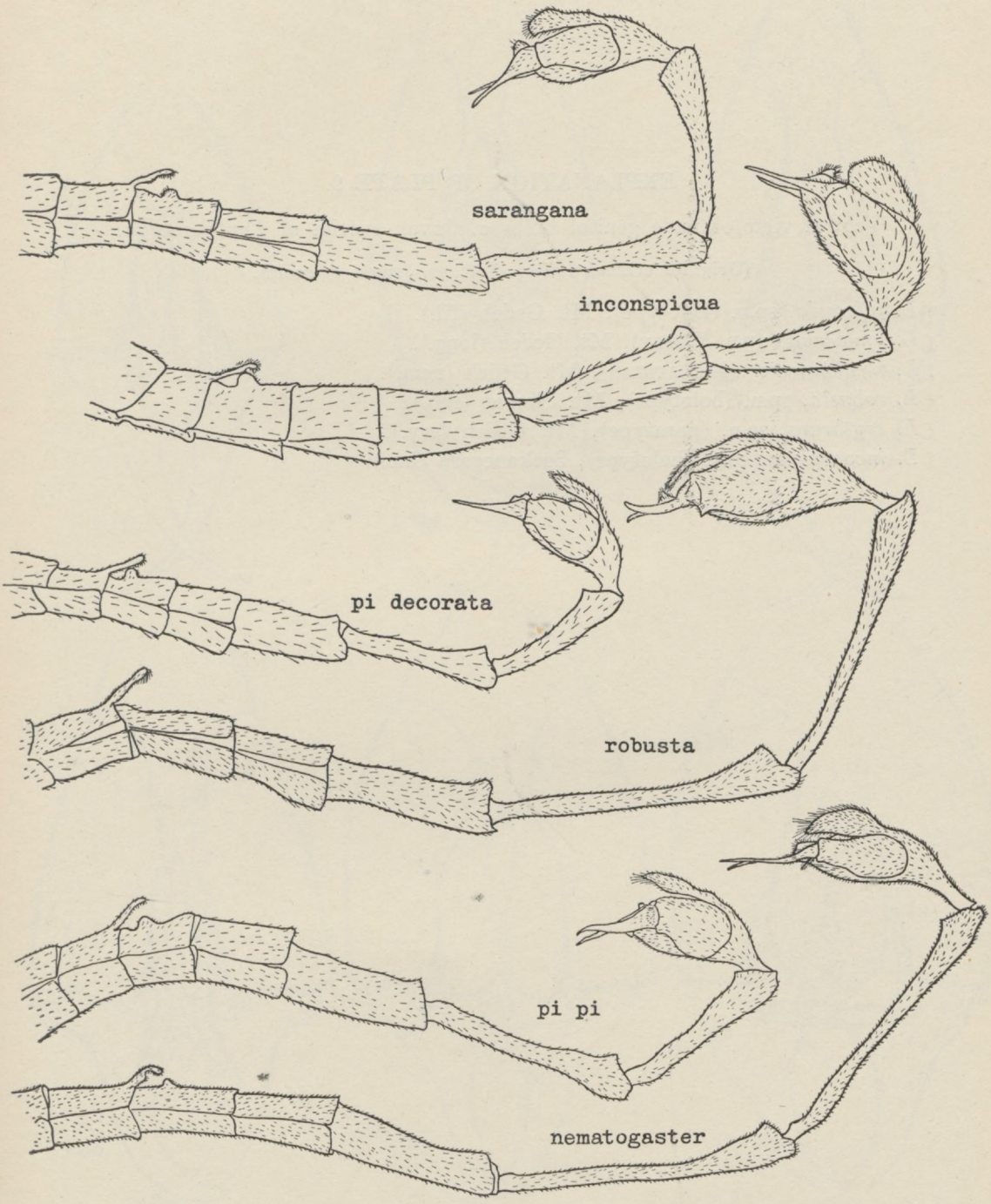
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 8.

Male abdominal segments of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. sarangana, sp.n. (holotype), Mt. Lawoe.
L. inconspicua, sp.n. (holotype), Soekanegara.
L. pi decorata, subsp.n. (holotype), Mt. Slamat.
L. robusta, sp.n. (holotype), Mt. Slamat.
L. pi pi (v.d. Weele) (plesiotype), Mt. Oengaran.
L. nematogaster (McLachlan), Mt. Gedeh.



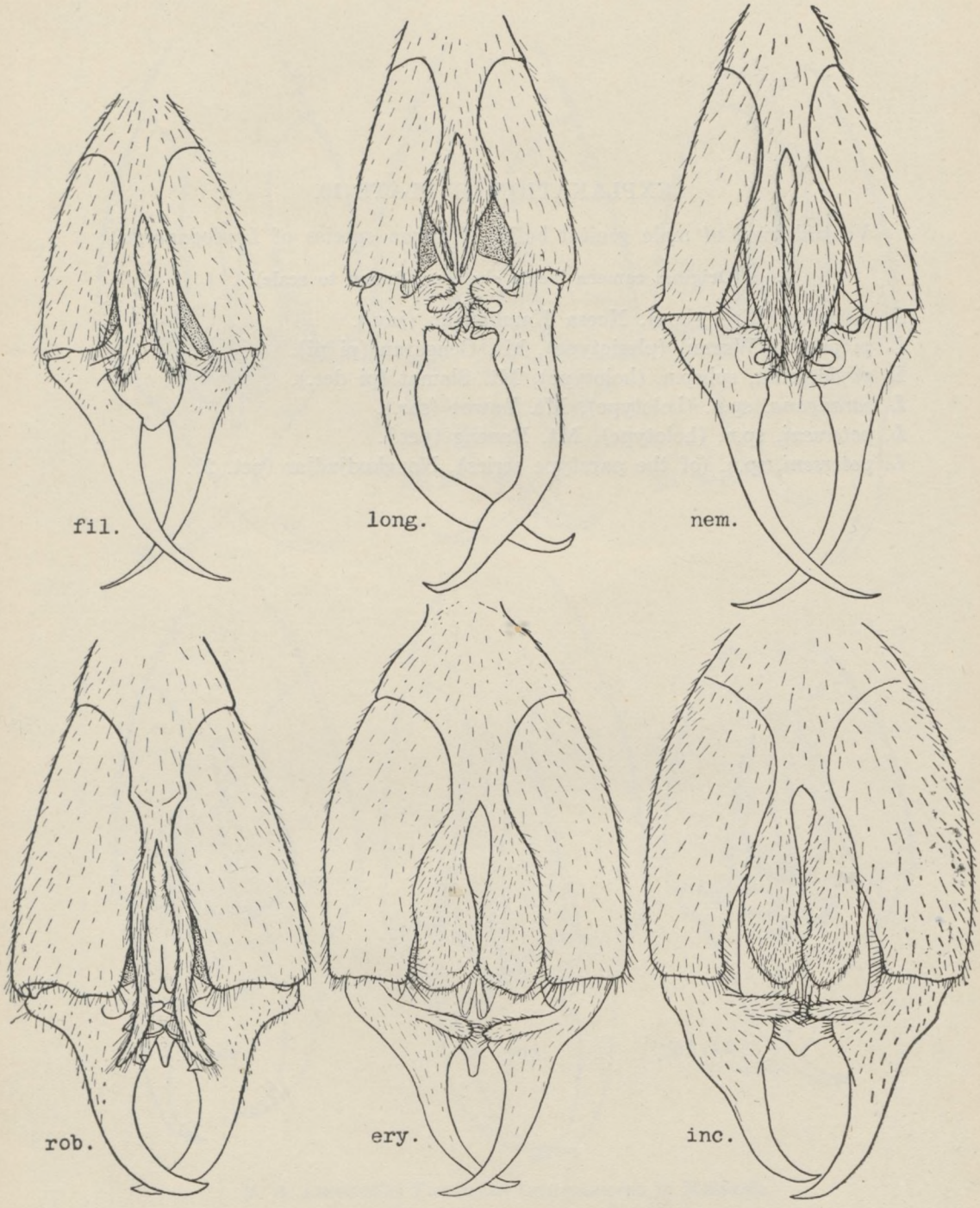
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 9.

Ventral view of male genital bulbs of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. filicauda, sp.n. (holotype), Mt. Gedeh (fil.).
L. longicauda (v.d. Weele), Mt. Gedeh (long.).
L. nematogaster (McLachlan), Mt. Gedeh (nem.).
L. robusta, sp.n. (holotype), Mt. Slamat (rob.).
L. erythrura, sp.n. (paratype), Mt. Gedeh (ery.).
L. inconspicua, sp.n. (holotype), Soekanegara (inc.).



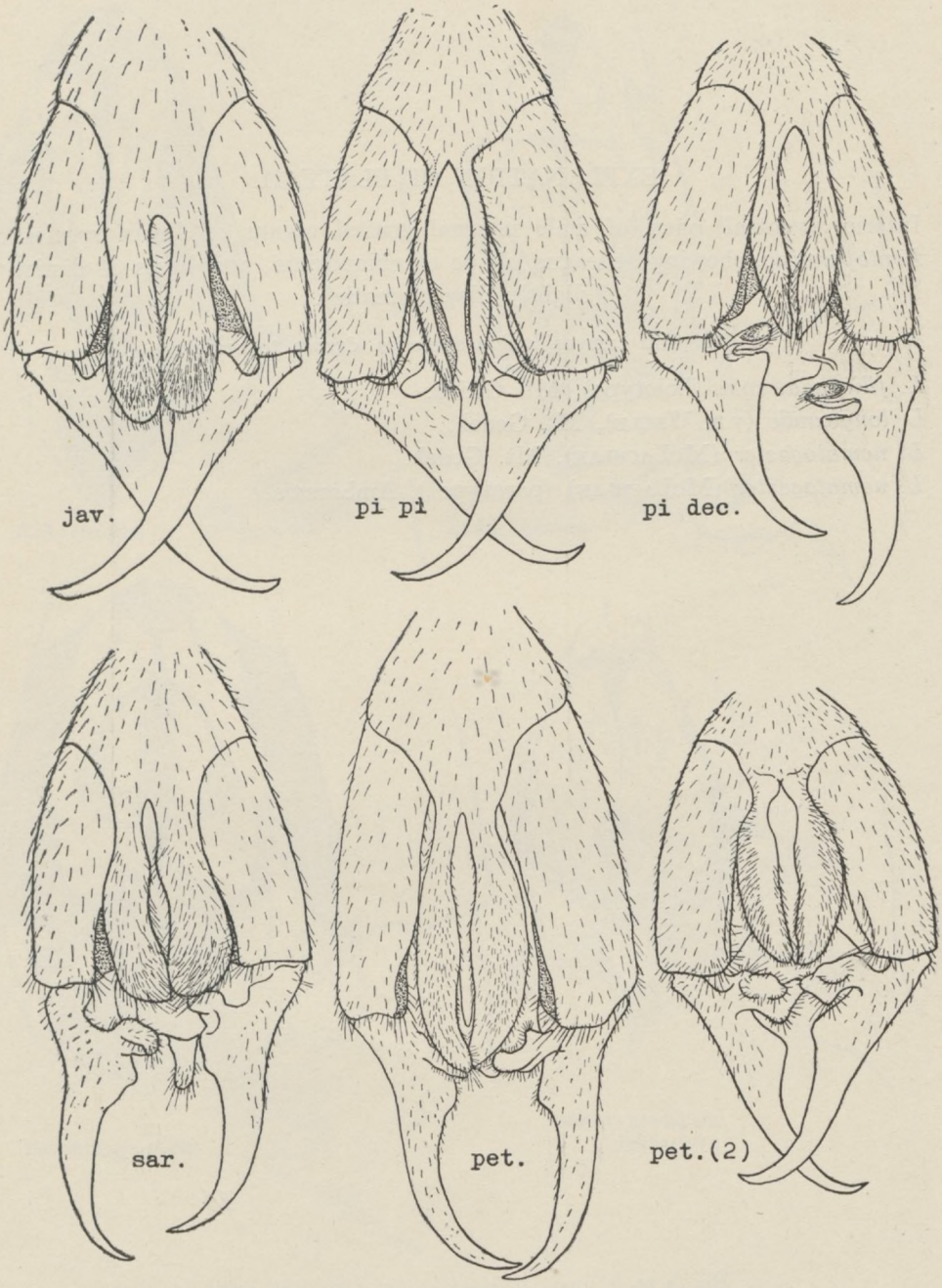
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 10.

Ventral view of male genital bulbs of Javan species of *Leptopanorpa*.

(Original camera lucida sketches, drawn to scale).

L. javanica (WESTWOOD), Noesa Kambangan (jav.).
L. pi pi (V.D. WEELE) (plesiotype), Mt. Oengaran (pi pi).
L. pi decorata, subsp.n. (holotype), Mt. Slamat (pi dec.).
L. sarangana, sp.n. (holotype), Mt. Lawoe (sar.).
L. peterseni, sp.n. (holotype), Mt. Raoeng (pet.).
L. peterseni, sp.n. (of the paratype series), Nongkodjadjar (pet. 2).



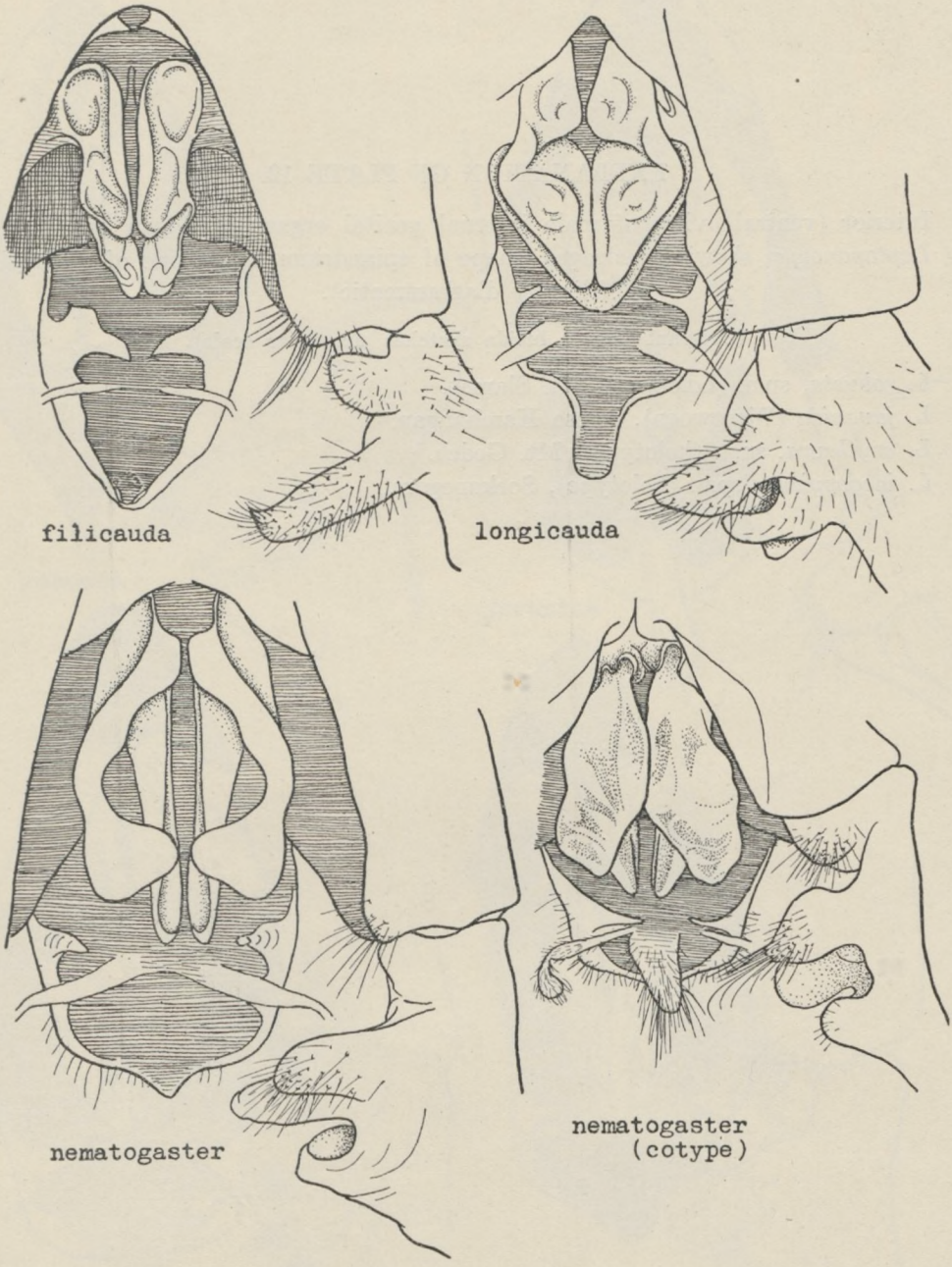
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 11.

Interior (ventral) view of male internal genital organs of Javan species of *Leptopanorpa,* showing aedeagus, shape of epiandrium, and bases of dististyli (slightly diagrammatic).

(Original camera lucida sketches, drawn to scale).

L. filicauda, sp.n. (holotype), Mt. Gedeh.
L. longicauda (v.d. Weele), Mt. Gedeh.
L. nematogaster (McLachlan), Mt. Gedeh.
L. nematogaster (McLachlan) (paratype!), Ambarawa.



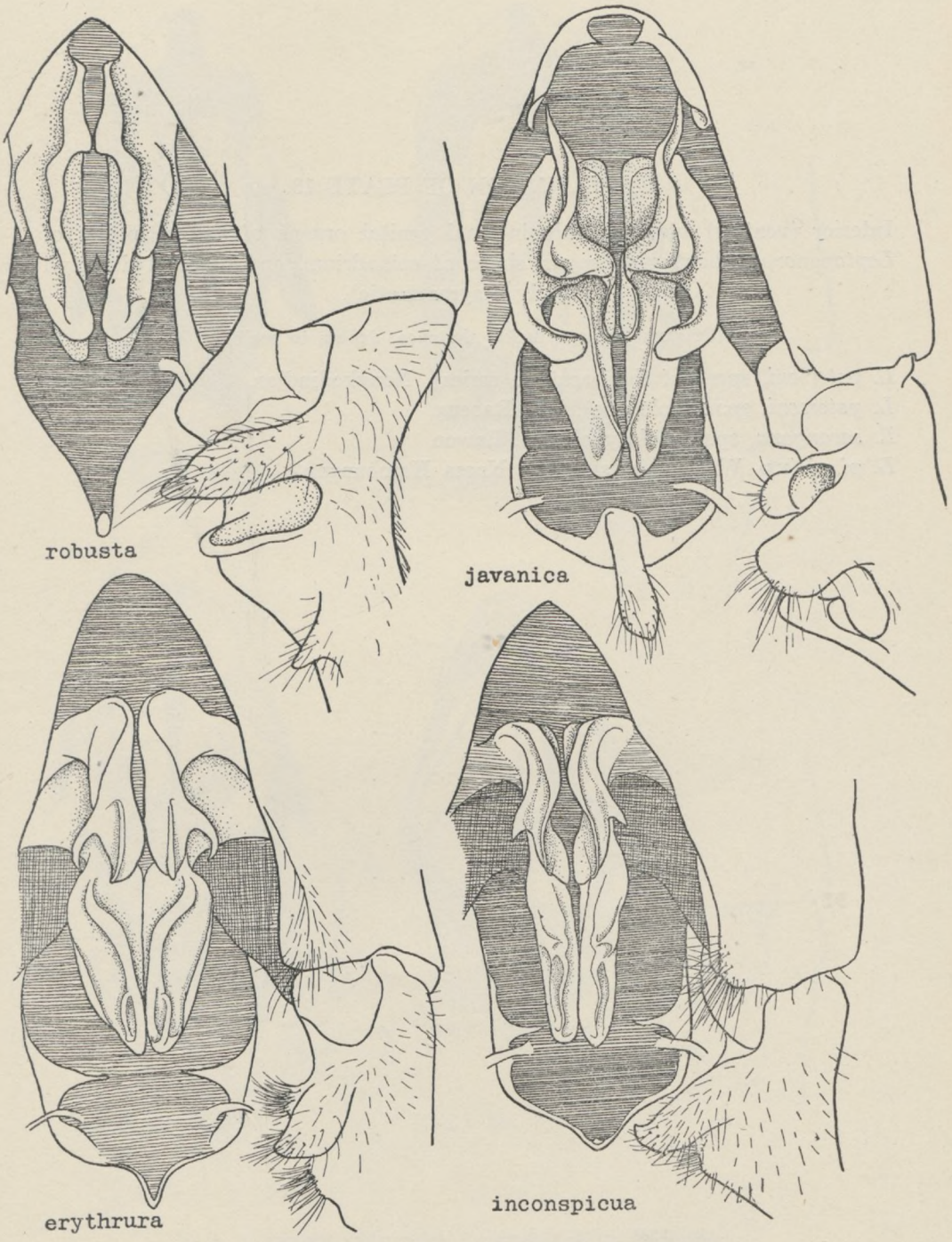
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 12.

Interior (ventral) view of male internal genital organs of Javan species of *Leptopanorpa,* showing aedeagus, shape of epiandrium, and bases of dististyli (slightly diagrammatic).

(Original camera lucida sketches, drawn to scale).

L. robusta, sp.n. (holotype), Mt. Slamat.
L. javanica (WESTWOOD), Noesa Kambangan.
L. erythrura, sp.n. (holotype), Mt. Gedeh.
L. inconspicua, sp.n. (holotype), Soekanegara.



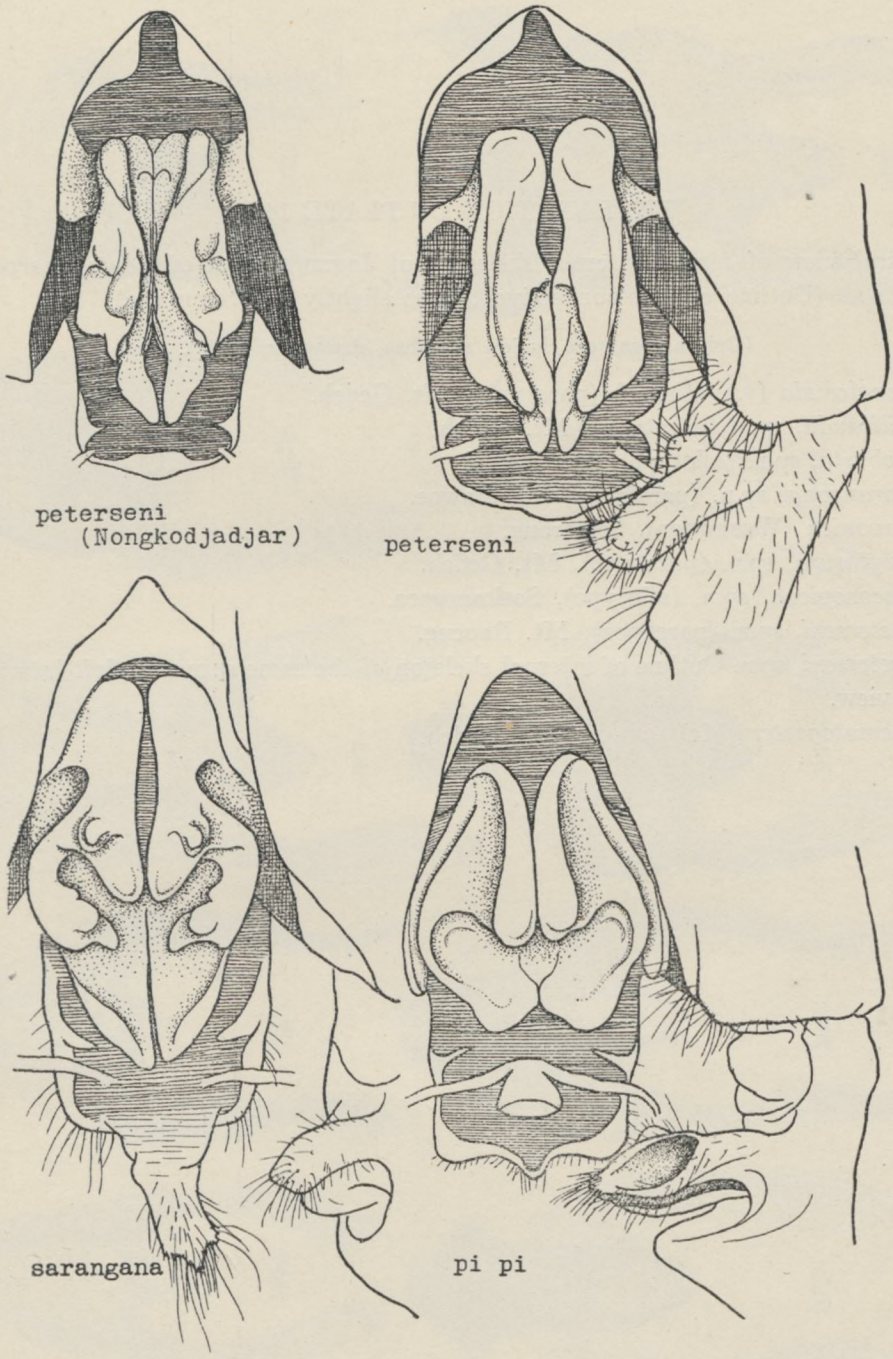
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 13.

Interior (ventral) view of male internal genital organs of Javan species of *Leptopanorpa,* showing aedeagus, shape of epiandrium, and bases of dististyli (slightly diagrammatic).

(Original camera lucida sketches, drawn to scale).

L. peterseni, sp.n. (of the paratype series), Nongkodjadjar.
L. peterseni, sp.n. (holotype), Mt. Raoeng.
L. sarangana, sp.n. (holotype), Mt. Lawoe.
L. pi pi (v.d. Weele) (plesiotype), Noesa Kambangan.



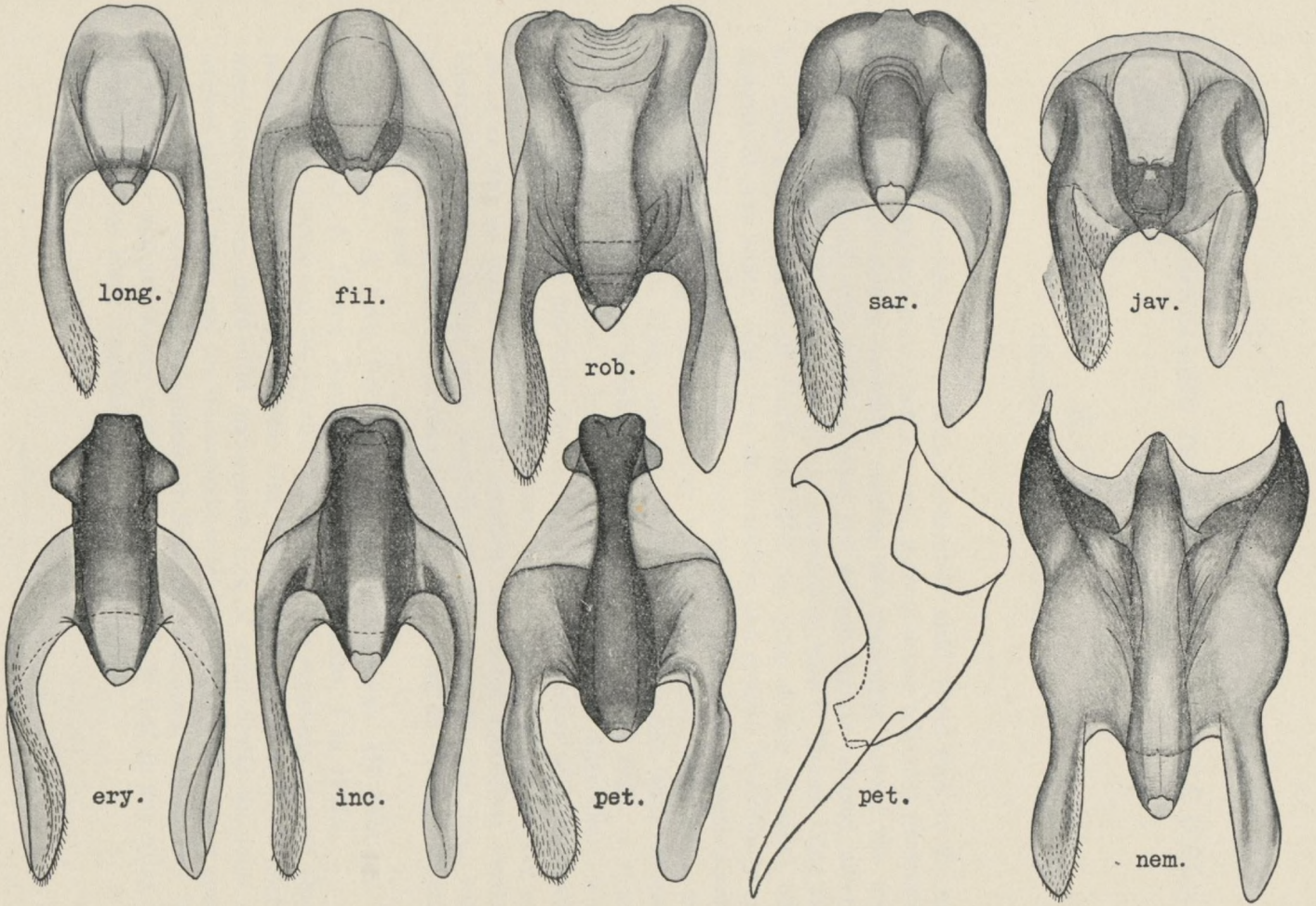
M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

EXPLANATION OF PLATE 14.

Ventral view of female internal skeletons of Javan species of *Leptopanorpa*. (Outline of soft connective tissues slightly diagrammatic).

(Original camera lucida sketches, drawn to scale).

L. longicauda (v.d. Weele) (paratype), Mt. Gedeh.
L. filicauda, sp.n. (paratype), Mt. Gedeh.
L. robusta, sp.n. (allotype), Mt. Slamat.
L. sarangana, sp.n. (paratype), Mt. Lawoe.
L. javanica (Westwood), Semarang.
L. erythrura, sp.n. (paratype), Mt. Gedeh.
L. inconspicua, sp.n. (allotype), Soekanegara.
L. peterseni, sp.n. (paratype), Mt. Raoeng.
L. peterseni, sp.n. Outline of internal skeleton of the same specimen, left lateral view.
L. nematogaster (McLachlan), Mt. Gedeh.



M. A. LIEFTINCK: The genus *Leptopanorpa* in Malaysia.

A NEW CAVE-DWELLING TENEBRIONID FROM JAVA (COL.).

By

K. G. BLAIR

(British Museum, London).

Tenebrio antricola sp. n.

Elongate subovate, pitchy black, moderately nitid. Head sunk to the eyes in pronotum, broad and convex between eyes, without ocular tubercles, moderately strongly but not closely punctate; canthus not projecting beyond the eyes; clypeus very broad, with angles rounded and margin slightly reflexed, anterior border not emarginate. Antennae stout, not reaching base of thorax, third joint but little longer than broad, fourth and fifth not quite as long as broad, sixth onwards of even width, wider than the preceding and opaque. Pronotum evenly convex, more strongly and closely punctured than the head, lateral margins arcuate from apex to base, the latter bisinuate, narrowly marginate, with posterior angles acute. Elytra appearing less nitid than thorax, with numerous small irregular transverse wrinkles; intervals flat, punctured much as thorax, striae represented by lines of larger but shallow punctures; apex blunt; wings present, but perhaps not fully developed. Underside clothed with moderately dense depressed golden brown pubescence; metasternum between coxae only about as long as intermediate coxal cavities; first three abdominal segments bordered laterally, rather more coarsely punctate than the last two; tibiae rounded externally, tarsi with claw-joint about as long as the rest together.

Length 10 mm.

Habitat: S. Java, Residency Banjoemas, Babakan. III 1933. (K. W. Dammerman); E. Borneo, Sanga Sanga (H. D. Jensen, 1 in B.M.).

Rather shorter and less parallel than most of its congeners, it most closely resembles the African *T. clypeatus* Geb., from which it differs in its slightly more convex form, more nitid appearance, lack of supra-ocular tubercles, less evident elytral striae and the transversely wrinkled intervals. The latter species has also been taken in bats' guano, at Fambani, Zambesia, in a hollow tree, (H. B. Cott) and at Chiluto, a locality I am unable to find in any atlas, but probably in the lower Zambesi valley or Mozambique.

FÜNF NEUE *TAENIOTHRIPS*-ARTEN VON SUMATRA (Thysanoptera).

Von

Dr. H. PRIESNER

(Cairo).

1. **Taeniothrips trifasciatus** spec. nov.

♀: Hellgelb, mit grauen Trübungen und einigen roten, mesodermalen Pigmentflecken, die letzteren besonders in der Nähe der Vordercoxen, Spuren aber auch im Pterothorax; Augen dunkel-purpurn; sehr schwach getrübt ist der Kopf vorn und an den Schläfen, die Ränder der Vorderschenkel und Vordertibien, einige schwache Flecke am Pterothorax, am dunkelsten sind die Coxen, auch am Abdomen sind die Sternite und Pleuralplatten deutlich getrübt, während die Tergite lichter sind; Borsten am Körper selbst licht, an den Fühlern und Flügeln jedoch verschieden, licht oder dunkel. Fühlerglied 1 licht, 2 stark grau getrübt, 3 etwa in der Grundhälfte licht, in der Endhälfte hellgrau, 4 in den basalen zwei Fünfteln oder im basalen Drittel licht, sonst hellgrau, das 5. ebenso, die folgenden einfarbig hellgrau. Flügel charakteristisch gebändert; Flügelbasis (inkl. Schuppe) bis zur Hauptader dunkel, die Costalgegend licht, die basale Trübung reicht etwa um die halbe Länge der Schuppe über diese hinaus; ausser dieser Basaltrübung mit zwei dunklen Querbinden, die durch ungefähr gleichbreite, hyaline Abstände getrennt sind, die Flügelspitze selbst ist wieder hyalin; an den dunklen Stellen sind die Borsten dunkel.

Kopf kurz, quer; Mundkegel kurz, Maxillarpalpen kurz, 3-gliedrig; Anteocellarborsten entwickelt, wegen der schrägen Kopflage aber nicht messbar, ebenso die Interocellaren gut entwickelt, aber dünn. Fühler sehr schlank, 320 - 330 μ; Masze der Glieder vom 2. an: 39 (24), 53 - 55 (16), 59 (16), 42 (14), 59 (13), 11 (6), 20 - 21 (4) μ; das 3. und 4. Glied am Ende halsförmig geschnürt, 4. länger ausgezogen als 3., Borsten auf den Gliedern gut entwickelt, am 3. und 4. 32 - 36 μ lang, z.T. getrübt; 6. Glied sehr schlank, nahe der Basis am breitesten, von da ab zum Ende etwas unregelmässig konisch verengt; sein Sinneskegel 52 μ lang; die Gabeltrichome am 3. und 4. Glied lang, etwa 36 μ;. Borsten auf der Pronotumscheibe sehr zerstreut, die Hintereckenborsten mässig lang, licht, 48 - 52 μ, innerhalb derselben nur 2 Paar Posteromarginalborsten vorhanden, die 26 - 28 μ messen; Pronotum 95 - 100 μ lang. Beine ohne Besonderheit, Tarsen schlank, Hintertibien ausser den Apikalspornen mit 7 - 8 Innenrand-Dörnchen, alle licht. Flügellänge 645 μ, Costa mit etwa 24, Hauptader mit 3 (4) + 3 basalen (von denen die letzteren 3 im weissen Teil stehen) und

2 Distalborsten, die, von den Basalborsten sehr weit getrennt, im weissen Spitzenteil stehen; Nebenader mit 12 - 14 Borsten; Kamm am 8. Tergit fehlt, Sternite ohne accessorische Borsten; Borsten am 9. Segment: dorsale 46 - 48, B. 1 der Hinterrand-Borsten 52, B. 2: 54 - 60 μ; B. 1 des 10. Segmentes 92, B. 2: 80 μ lang. 10. Segment oben nicht gespalten. Legebohrerlänge 228 μ. — Körperlänge (gedehnt): 1.1 mm. Schuppe mit 4 Randborsten (ausser den apikalen Haaren) und der normalen Subbasalborste in der Mitte.

Fundert: 1 ♀, Süd-Sumatra, Wai Lima, Lampongs, 17.12.1921, in Kampong-Gebüsch, an *Costus* (poetjoek-Rollung), H. H. KARNY, No. 475.

Diese Art kann zwar durch die Flügelfärbung mit keiner der bisher bekannten verwechselt werden, ist aber sicherlich mit *T. taeniatus* KARNY nahe verwandt; bei diesem hat jedoch das Abdomen eine dunkle Querbinde, die sich über zwei Segmente erstreckt, und die Flügel haben nur zwei dunkle Binden, von denen die zweite einen sehr grossen Raum einnimmt.

2. **Taeniothrips scindapsi** spec. nov.

♀: Hellgelb, Kopf vorn stark, hinten schwächer getrübt, am Hinterrande fast ganz gelb; Beine hellgelb, Flügel gleichmässig und stark getrübt (mit einem kleinen, ovalen Subbasalfleck), an der äussersten Spitze schwach aufgehellt; Fühlerglieder 1 und 2 braungrau, wie der Kopf, das 2. am Ende etwas lichter, 3. Glied weisslich, gegen das Ende (etwa von der Mitte ab) sehr leicht grau angehaucht, das 4. etwa am Grunddrittel klar, sonst hellgrau, das 5. ebenso oder nur am äussersten Grunde licht, die Endglieder hellgrau. Körperborsten nicht oder kaum getrübt.

Die grossen Augen seitlich nicht vorgewölbt, Facetten grob, zwischen denselben spärlich auffallende Härchen; Kopfbreite an den Augen 164, dorsale Kopflänge von den Augen an 120 (total 140) μ; Augenlänge 76 - 84 μ; Anteocellarborsten klein, Interocellaren etwa 48 μ, zart, zwischen den hinteren Ocellen gelegen; postocellare Reihe einfach und schwach; Mundkegel kurz. Fühler dünn, 372 - 380 μ lang; Gliederlängen (-breiten): 28 (30), 42 (27), 63 - 64 (15), 73 (17), 52 (15), 69 - 70 (17), 17 (6 - 7), 20 (5) μ; das 1. Fühlerglied ist das dickste von allen, das 2. ebenfalls stark, die folgenden lang und dünn; der Stiel des 3. Gliedes ist vom übrigen Teil durch eine weisse Haut abgegrenzt, am Ende ist das 3. Glied etwas geschnürt, Sinneskegel sehr (68 μ) lang; 4. Glied lang, am Ende etwas deutlicher halsförmig geschnürt; 5. Glied am Ende am breitesten, 6. Glied schlank, konisch, das 1. Stylusglied viel länger als breit, an der Basis am breitesten; 6. Fühlerglied vor dem Ende mit einem langen (84 μ) Sinneskegel, der die Fühlerspitze überragt, ein weiterer, der etwa in der Mitte des 6. Gliedes entspringt, 92 - 96 μ, erreicht die Basis oder Mitte des 8. Gliedes. Prothoraxscheibe mit sehr gut entwickelten, lichten Diskalborsten, Hintereckenborsten 68 - 72 μ, fast ganz licht; innerhalb dieser nur 2 Paar Posteromarginalborsten. Flügel schmal, Länge 0.97 - 0.99 mm, nur an der Basis etwas erweitert, ihre Borsten dunkel; Schuppe mit 4 Vorderrandborsten; Costa mit etwa 28, Hauptader mit 4 (3) + 3 basalen und 2 Distal-Borsten; Nebenader

mit 17 - 18 Borsten; alle Borsten gut entwickelt, gegen die Spitze werden sie ziemlich lang. 8. Tergit ohne Kamm, Sternite ohne accessorische Borsten; Beine schlank, Endsporne der Tibien fein, Innenrand der Hintertibien ausser den Spornen mit 7 Börstchen; Borsten am 9. Segment mässig lang, die dorsalen 60, die Hinterrand-Borsten 64 - 68, B. 3, 85 µ; B. 1, 2 am 10. Segment länger, 100 µ; alle hellgelb. Legebohrer 292 µ. — Körperlänge 1.38 - 1.45 mm.

Fundort: Sumatra, G. Sibajak, ± 1800 m, 10.2.1924, an *Scindapsus* sp., leg. W. M. Docters van Leeuwen (no. 7795).

Diese Art gehört in die Gruppe der Arten mit konstant 2 Distalborsten der Hauptader, die durch einen sehr grossen Zwischenraum von nur 6 - 7 Basalborsten getrennt sind; in dieser Gruppe, zu der auch der oben beschriebene *trifasciatus* gehört, kommt sie *crispator* Karny am nächsten; von dieser und der folgenden Art ist sie aber durch die viel längeren Fühler, besonders das längere 4. Glied und die viel längeren Flügel verschieden.

3. **Taeniothrips tenerrimus** spec. nov.

Diese Art, bisher nur in einem Exemplar bekannt, steht dem *crispator* Karny noch näher als die vorige, ist aber, wie ein Vergleich der Typen lehrt, durch die bedeutend kürzeren Borsten des Prothorax und die viel weniger zahlreichen und weniger dicht stehenden Diskalborsten der Pronotum-Scheibe hinlänglich verschieden, um als besondere Art erkannt zu werden.

♀: Hellgelb, etwas verblasst, da aber die Flügel ganz dunkel sind, darf man annehmen, dass sich auch die Körperfarbe durch die Konservierung wenig geändert hat; Beine hellgelb, Kopf vorn etwas getrübt, Färbung daher sehr ähnlich wie bei *scindapsi;* das 3. und 4. Fühlerglied in der Basis-Hälfte, das 5. im Grunddrittel, weisslich, übrigens schwach grau getrübt, 6. - 8. Glied dunkel, 6. (ob immer?) am Grunde etwas aufgehellt; Borsten am Körper ziemlich licht, wie bei vorigem.

Augenlänge 70 µ, Kopflänge 108 µ (total 120 µ); Breite höchstens 140 µ; Ocellen einander genähert, Abstand der hinteren voneinander nur 12 µ; Interocellarborsten einander sehr nahe, 8 µ, ihre Länge etwa 35 µ; Anteocellaren seitlich, weit vor dem vorderen Ocellus; Mundkegel sehr kurz, Maxillarpalpen nur sehr mässig lang, wie bei vorigem. Fühlerlänge 420 µ; Gliederlängen (-breiten): 22 (24), 36 (22), 50 (14), 56 (14), 42 (13), 57 (13), 15 (5), 17 (4) µ; Borsten an den Fühlern leicht getrübt; das 3. Glied in seiner Form wie bei voriger Art, Sinneskegel desselben 32 - 36 µ lang, Sinneskegel am 6. Glied wie bei *scindapsi,* Länge des proximalen 60 - 64 µ, er entspringt aber schon am Ende des 1. Drittels der Gliedlänge und erreicht die Mitte des 1. Stylusgliedes; der distale Kegel (56 µ) überragt die Fühlerspitze. Prothorax kurz, 88 µ, 164 - 168 µ breit, demnach sehr stark quer, die äusseren Hintereckenborsten 48 - 52, die inneren 52 - 56 µ lang, 2 Paar innere Posteromarginalborsten; Scheibe nur sehr spärlich mit Börstchen versehen, während *crispator* eine viel grössere Zahl solcher Borsten besitzt. Flügellänge 676 µ; Costa mit etwa 25, Hauptader mit 3 + 3 basalen und, nach grosser Lücke, 2 distalen Borsten; Nebenader mit 15 Borsten;

Schuppe mit 4 Borsten nahe dem Vorderrande und der normalen Subbasalborste. Innenrand der Hintertibien mit 7 Subapicaldörnchen; 8. Tergit ohne Kamm, Sternite ohne accessorische Borsten; Borsten am 9. Segment, dorsale 40 μ, B. 1 des Hinterrandes etwa 42, B. 2: 48 μ, B. 3: 53 - 56 μ; am 10. Segment sind B. 1: 78 - 84, B. 2: 67 - 70 μ lang. Legebohrer 242 - 246 μ. — Körperlänge (stark kontrahiert): 0.85 mm.

Fundort: 1 ♀, Süd-Sumatra, Lampongs, Wai Lima, in Blattrand- und poetjoek-Rollungen an *Gordonia*, im Urwald, 18.11.1921 (H. H. KARNY, No 102).

4. **Taeniothrips fallax** spec. nov.

♀: Mehr oder weniger dunkel braun, mit orange bis rötlichem Pigment im Thorax, 1. und 2. Fühlerglied wie der Körper gefärbt, das 3. hellgelb, seltener oben schwach getrübt, das 4. bei ganz lichten Stücken (gebleicht) ebenso, normalerweise aber dunkel, nur am Grunddrittel hellgelb, das 5. etwa in der Grundhälfte hellgelb, übrigens getrübt, die Endglieder dunkel, selten das 6. am Grunde etwas aufgehellt (cf. v. *pavidus*); Flügel einfarbig stark getrübt, in manchen Fällen, so bei der Holotype aber an der Basis heller grau, niemals völlig hyalin; an den Beinen sind die Hüften und Schenkel dunkel, die letzteren an der Basis aufgehellt, Tibien gelblich, an den Rändern mehr weniger deutlich getrübt. Borsten am Körper dunkel.

Kopf breiter als lang, bei grossen Stücken (Holotype) von den Augen an 120 (total 132) μ lang, an den Augen 152, an den gewölbten Wangen 160 μ breit; Augenlänge (lateral) 72 - 76 μ; Interocellar-Borsten etwa in der Höhe des Vorderrandes der hinteren Ocellen gelegen, einander stark genähert, lang, 64 - 66 μ; Maxillarpalpen schlank; postokulare Reihe klein, ohne Besonderheit; 1 Paar sehr kleiner Anteocellarborsten dicht innerhalb der Netzaugen, an den Seiten des vorderen Ocellus. Fühlerlänge 284 - 308 μ; Gliederlängen (-breiten) der Holotype: 48 (27), 40 (25), 62 (21), 64 (?), 40 (17), 56 (?), 10 (6), 12 (5) μ; 3. und 4. Fühlerglied am Ende kurz halsförmig geschnürt; 5. Glied zum Ende stark geradlinig erweitert, etwa vom letzten Viertel an geradlinig gegen das Ende verengt; Stylus ziemlich schlank. Beine ohne Besonderheit, Hintertibien am Innenrande mit 10 - 13 Börstchen; Pronotumscheibe mässig dicht mit Börstchen besetzt, immer mit zwei grossen Kahlstellen; Hintereckenborsten sehr lang, 88 (*pavidus*) - 100 μ, innerhalb derselben mit 3 Paar kleiner Börstchen, von denen die inneren sehr gut entwickelt sind, etwa 44 μ; Flügel an der Basis breit, nach dem ersten Drittel bedeutend schmäler, Costa mit 23 - 27, Hauptader mit 4 (3) + 3 basalen und 2 hievon sehr weit entfernten distalen Borsten, Nebenader mit 11 - 13 Borsten; Flügelborsten sehr gut entwickelt; Pterothoraxbreite bei grossen Stücken 268 μ, Länge bis zur Basis der Hinterhüften etwa 310 μ, Pterothorax im ganzen nach hinten verengt; Flügellänge 0.74 (*pavidus*) - 0.9 mm. 8. Tergit mit Kamm, der aus langen, dicht stehenden Härchen besteht; Sternite ohne accessorische Borsten; Borsten am 9. Segment: dorsale gut entwickelt, 60 - 65 μ, B. 1 der Hinterrand-

Reihe bei den grössten Stücken nur 80 (bei v. *pavidus* 64) μ, B. 2: 128 - 140 μ, B. 3 etwa 120 μ (bei v. *pavidus* 108 - 112 μ); B. 1,2 am 10. Segment 104 - 112 μ. Legebohrer 240 - 304 μ. — Körperlänge: 1.14 (*pavidus*) — 1.4 mm.

♂: Das ♂ stimmt mit dem ♀ sowohl in der Färbung des ganzen Körpers als auch in der Fühlerbildung überein, nur sind die Wangen weniger gewölbt. Das 3. - 7. Sternit je mit kleinen, quer-ovalen Drüsenfeldern, die bei typischen Stücken 34 - 36, 30 - 36, 32 - 34, 28 - 32 und 28 - 32 μ in der Breite, und 10 - 14 μ in der Länge messen, bei kleineren Stücken aber schmäler sein können und nur 8 μ lang sind; 9. Segment dorsal mit zwei etwa 16 μ langen Dörnchen, deren Zentralabstand 12 - 22 μ beträgt; hinter diesen stehen zwei einander noch mehr oder ganz genäherte kleine Börstchen; seitlich von den Dornen, also höher als diese Börstchen, 1 Paar etwa 60 μ lange Borsten; Seitenborsten am 9. Segment kräftig, die längsten etwa 108 μ.

Ich konnte mich nicht entschliessen, die kleinen Exemplare als besondere Art aufzufassen; sie sind durch die kürzeren (285 μ) Fühler, die auch etwas lichter sind (6. Gl. an der Basis aufgehellt), die kürzeren Hintereckenborsten des Pronotums (88 μ) und die nur etwa 65 μ langen B. 1 des 9. Hinterleibs-Segmentes verschieden; Fühlermasse: 22 (?), 36 (27), 50 - 52 (21) 56 (19), 36 - 38 (18), 50 (17), 8 - 10 (7), 13 - 14 (5) μ. Ich möchte sie vorläufig als var. ***pavidus*** nov. separieren.

Fundort: W. Java, G. Gedeh, Tjibodas, ± 2000 m, 8. Nov. 1925, in Blüten von *Saurauja* (W. M. Docters van Leeuwen No. 8555); Tjibodas, ± 1400 m, 27. Dez. 1919, in Blüten von *Saurauja leprosa* Korth. (W. M. Docters van Leeuwen leg.); var. *pavidus* nov., Sumatra, Ostküste, Bandar Baroe, Sept. 1920, in Blüten von *Saurauja* spec. (W. M. Docters van Leeuwen, Herb. No. 24).

5. **Taeniothrips alticola** spec. nov.

Priesner, Philippine Journal Science, 1935, 57, p. 355.

Eine sehr grosse Art aus der Gruppe des *T. picipes* Zett., von mir bereits gelegentlich der Beschreibung des nahestehenden *T. oreophilus* erwähnt (l.c.). Viel grösser als *picipes*, von der Grösse des *oreophilus*.

♀: Dunkelbraun, frische Exemplare sicherlich mit rotem Pigment, wenigstens im Thorax; Schenkel dunkel, Trochantern lichter, Tibien stark getrübt, aber bisweilen lichter als die Schenkel, die Trübung wolkig, Hintertibien, mitunter auch die mittleren, an der Basis mit hellgelbem Ring, und oft auch an der Spitze etwas lichter, Tarsen gelblich oder graugelblich. Borsten am Körper dunkel. Flügel gleichmässig, stark getrübt, an der Basis etwas lichter, jedoch nicht hyalin. Fühler dunkel, das 3. Glied hellgelb (oberseits bisweilen schwach getrübt), 4. und 5. Glied am Grunde nicht gelblich, wohl aber mit einem hell-grauen Subbasalring oder das 4. an der ganzen Basis weisslich oder blassgrau.

Kopf samt Gipfel etwa 175 μ, von den Augen an 152 μ lang, an den grob facettierten Augen 176 - 180 μ, an den Schläfen 170 μ breit; Augen stark vorgewölbt, Kopf hinter den Augen stark geschnürt, Wangen mässig gewölbt;

dorsale Kopfborsten bei der Type nicht messbar (s.u.); Maxillarpalpen lang, Glieder 20, 18 und 24 - 26 μ. Fühlergliederlängen (-breiten) vom 3. an: 80 - 84 (?), 90 - 92 (25), 56 - 58 (20), 78 - 80 (20), 14 (11), 22 - 24 (7) μ; das 3. Glied am Ende nicht halsförmig geschnürt, auch das 4. Glied zum Ende gleichmässig verengt oder kaum geschnürt, nicht flaschenförmig, Gabeltrichome am 4. Glied etwa 85 μ lang; 6. Glied schmal. Pronotum 155 μ lang, 240 μ breit, mit 2 sehr langen Hintereckenborsten, 140 und 120 μ; die inneren Hinterrandborsten sind normalerweise in drei Paaren vorhanden, von denen das innerste ganz bedeutend grösser ist als die anderen und von ihnen weiter absteht; vor diesen stehen 3 Paar Scheibenborsten fast in einer Querreihe; Pterothorax mächtig. Beine schlank, Hintertibien etwa 295 μ lang, an der breitesten Stelle 46 μ breit, am Grunde dünn, Innenseite mit 13 - 14 gelben Stachelchen (abgesehen von den Endspornen). Flügel etwa 1.31 mm lang, ihre Borsten lang, Costalborsten gegen die Flügelspitze hin sehr lang (die der 1. Distalborste gegenüber stehende Costalborste misst 140 μ); Hauptader mit 4 (3) + 3 + 3 basalen und 1 + 2 distalen Borsten; die Basalborsten erreichen etwa die Flügelmitte, die 1. Distalborste hat eine Länge von etwa 100 μ; Nebenader mit 13 Borsten. Sternite des Abdomens ohne accessorische Borsten, 8. Tergit mit sehr langem, dichtem, vollständigem Kamm; Borsten am 9. Segment: dorsale 80, B. 1 des Hinterrandes 136, B. 2 und 3, 172 - 180 μ; B. 1, 2 am 10. Segment etwa 180 μ; Legebohrer 295 μ. 10. Segment oben bis etwas über die Borsten-Basis gespalten. — Körperlänge (gedehnt): 1.92 - 2 mm.

Die Exemplare von Java stimmen in allen wesentlichen Merkmalen mit den sumatranischen überein, sie sind nur etwas robuster: Fühler des grössten Stückes, vom 3. Gliede: 98, 100, 64, 87, 14 - 16, 22 - 24 μ. Länge der Interocellarborsten, die zwischen den hinteren Ocellen gelegen und nahe aneinander gerückt sind, 105 μ; Hinterecken-Borsten des Prothorax 128 und 164 μ. Nebenader des Vorderflügels mit 17 - 18 Borsten.

Fundort: Holotype, Sumatra, G. Sibajak, ± 1800 m, 10.2.1924, an *Scindapsus* spec. (leg. W. M. DOCTERS VAN LEEUWEN, No. 7795); Paratypen, W. Java, G. Pangerango, 3000 m, 1923 (leg. L. FULMEK, No. 54).

Diese Art kann mit *T. major* BAGN. aus Indien nicht identisch sein, da bei diesem das 4. Fühlerglied kürzer ist als das 3., auch sind die Flügel distal etwas aufgehellt; *T. oreophilus* PR. hat fast die ganze Basalhälfte des 5. Fühlergliedes hellgelb und das basale Drittel des 4. Gliedes, und hat, im Vergleich mit den dunklen Schenkeln viel hellere Tibien, ist aber sonst sehr ähnlich.

THE COMMON ORIENTAL HORNETS, *VESPA TROPICA* AND *VESPA AFFINIS*, AND THEIR COLOR FORMS.

By

J. BEQUAERT

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Perhaps the most common Hornets of the Oriental and Indo-Malayan regions are the large black or fuscous wasps with the second or first and second abdominal segments partly or wholly orange or orange-yellow. In most collections these wasps stand as *Vespa cincta* and *Vespa affinis*, the latter being often regarded as a variety of the former. A study of structure, however, discloses that two quite distinct species are commonly confused under these names. This fact, unfortunately, was not recognized by R. DU BUYSSON, when he wrote his monograph of the Vespinæ (1905). At the Paris Museum, he placed specimens of both species under *V. cincta* var. *affinis*, as well as under *V. cincta*. J. PÉREZ (1910) first noticed the confusion, when he described his *V. indosinensis* as distinct from *V. cincta;* and more recently (1922), S. LEEFMANS suggested that two distinct species were possibly united under *V. cincta* and its varieties.

The oldest name for the more common of the two species appears to be *Vespa tropica* (LINNAEUS). If structural characters alone are recognized as binding for the delimitation of species, as I have done consistently in my work with Diploptera, several other so-called "species" of DU BUYSSON's monograph should be regarded merely as color forms, or "races", of *V. tropica*.

The second species is perhaps rarer, although, owing to the persistent confusion with *V. tropica*, it is as yet impossible to gain a clear idea of its distribution. I have reached the conclusion that it was the insect originally described by LINNAEUS as *Apis affinis* and later called *Vespa affinis* by FABRICIUS.

I have endeavored to unravel the several forms of these two Hornets, in so far as feasible with museum material. Entomologists residing in India, the Orient, or the East Indies should take up their study in the field and, among other points, enlighten us about possible ethological differences between the two species.

I have studied material belonging to the Musée Royal d'Histoire Naturelle de Belgique, Brussels (Brux. M.), the American Museum of Natural History (A.M.N.H.), the United States National Museum (U.S.N.M.), the Philadelphia Academy of Sciences (Phila. Ac.), the Museum of Comparative Zoölogy, Cambridge, Mass. (M.C.Z.), Rijksmuseum van Natuurlijke Historie, Leiden

(Leid. M.), the Department of Entomology, Philippine College of Agriculture (Phil. Agri.), the Philippine Bureau of Science (Phil. B. Sci.), the Paris Museum (Par. M.), the Zoologisches Museum, Berlin (Berl. M.), and the Deutsches Entomologische Institut, Berlin-Dahlem (D.E.I.). Interesting specimens were also received from Dr. KEIZO YASUMUTSU (Kyushu Imperial University, Fukuoka, Japan), Mr. C. F. CLAGG, Mr. W. E. HOFFMANN (Lingnan University, Canton, China), and Mr. J. L. GRESSITT. Dr. J. VAN DER VECHT sent me a list of the specimens in the collections of the Leiden Museum. He also examined for me the type of *Vespa unicolor* at Oxford and called my attention to LEEFMANS' account of the habits of *V. affinis;* I am under further obligations to Dr. VAN DER VECHT for arranging for the publication of additional specimens from various localities, recognized by him at the Zoological Museum, Buitenzorg. These I have not examined myself and are therefore listed in a special paragraph under "Additional specimens (Buit. M.)".

Ethology. — The nesting habits and behavior of *V. tropica* and *V. affinis* have been little studied thus far. The few published accounts, referring as a rule to *V. cincta*, disagree in at least one important particular, which may possibly be due to the confusion of two species.

A first group of observers, who described nests of "*V. cincta*" placed inside hollows, probably dealt with true *Vespa tropica* [1]). G. A. J. ROTHNEY (1903), in Barrackpore, Bengal, saw a nest, built in a large square flower-pot, which was added to year after year, the colony seemingly being perennial. According to J. C. KONINGSBERGER (1908; in Java, where *V. affinis* is not known) and W. S. BRISTOWE (1932; in Siam), *V. tropica* generally nests in hollow trees, occasionally in houses. H. MAXWELL-LEFROY and F. M. HOWLETT (1909) state that, in the plains of India, "It is found generally in thick forest. It makes its nests in the holes of big fig and other forest trees and has been observed to attack the nests of *Polistes hebraeus* and carry off the larvæ from the cells, the *Polistes* making no opposition." H. LUCAS (1891) describes the larva taken from a nest in Penang. W. S. BRISTOWE relates that both the Laos and the Siamese are very fond of the grubs of this hornet.

There are also accounts of aërial nests referred to "*V. cincta*" and it may be suggested that these observations were perhaps really based upon *Vespa affinis*, a form of which (var. *continentalis* J. BEQUAERT), homeochromic with typical *V. tropica*, is by no means rare in India. B. CHOPRA (1925) describes and figures an unusually large nest found attached to the stem of a small tree in a garden near Calcutta. It was fixed at a height of about 4 feet from

[1]) C. HORNE's (1870) account unfortunately is unreliable since it refers jointly to *V. orientalis* and *V. tropica*. He states that, in the North-West Provinces of India, these Hornets build „nests of prepared earth, strongly impregnated with some viscid substance, probably derived from the gum of a tree." The cells are regular hexagons and built from an hexagonal groundplan. The whole structure often reaches a large size and the outside is covered with a coating of loose paper. The nest is placed in some hollow, frequently in the mud walls of houses. The wasps work at night as well as during the day. The painful sting induces considerable inflammation and is believed sometimes to cause death. [*V. orientalis* is known often to mix clay with the paste for its cells; but the habit has not been recorded for *V. tropica*.]

the ground. It is said to have been first noticed in March, when it was quite small; in May it was the size of a man's head and toward the end of October of the same year it had attained its maximum size, about 109 cm in length and over 64 cm in greatest width near its base. It was perfectly pear-shaped, broadest below and gradually tapering to the upper end. It was principally attached near the base to the tree-trunk on one side, but it was also fixed to a fairly stout branch at the apex; while a number of small branches passing right through it gave it additional support. The outer envelope of papery material had the usual appearance of that of other Hornet nests, but was strong enough to withstand successfully the full force of the monsoon for a whole season. The nest was completely enclosed except for two nearly circular openings on the two sides near the base, both serving as entrance and exit. The inside of the nest is described as follows: "On breaking open the envelope on one side we see tiers of combs lying horizontally one above the other, and supported by short vertical pillars formed in between respective tiers. The combs consist of a very large number of cells and are the habitations of thousands of adults and young members of this vast colony. The lower three or four tiers of combs are seen to be full of larvæ and pupæ, while the upper ones which appear deserted, are evidently used by the adults. The cells housing the pupæ are covered at their mouths with silken caps. The combs are not attached to the envelope, but there is a large amount of space left between the two, so that access is available to each comb all round. The envelope, especially in its upper parts, is several layers thick, and in its structure contains a network of air-pockets which give the appearance of tunnel-like passages connecting the upper tiers with the general space round the basal combs" [2]). J. Carl (1934) also records observing an aërial, openly exposed nest of *"V. cincta"*, in the Nilgirris, southern India. When he found it in the dry and cool season (December), the envelope had suffered much from weathering. The nest contained nevertheless a few unagressive wasps, mostly workers. According to Carl, this indicates a resting period in a perennial colony, a point which should be very carefully investigated. An earlier observation, by G. A. J. Rothney (1877), also suggests that *V. tropica* or *V. affinis* may perhaps start a new nest either by several fecundated females, or queens, working in unison, or by a swarm consisting of a queen and a number of workers. He observed in Barrackpore, Bengal, a young nest of *"V. cincta"* started in a rose bush and attended by about seven wasps. M. Maindron's observations (quoted by R. du Buysson, 1905) of large aërial nests of *"V. cincta"*, which he saw near Menoekwari, in Mansinam Island, Doré Bay, N. New Guinea, almost certainly refer to one of the varieties of *V. affinis*. Moreover, R. du Buysson (1905, p. 535, Pl. XIII) also describes and figures a large aërial nest of *"V. cincta* var. *affinis"*, sent to the Paris Museum from Penang, Malacca. It was pear-shaped, 65 cm long

[2]) The figure of the nest with part of the envelope removed on one side, shows about nine tiers of cells in the lower, swollen half, while the narrower, upper half seems to be filled entirely with a sponge-like mass of paper layers and air-pockets. The purpose of this arrangement is not clear.

and 52 cm in greatest width, and contained twelve combs, some of the cells being differentiated for the rearing of queens. The pillars connecting the combs were oval or elliptic, not circular in cross-section. The nest, broadly fixed to a tree branch at the upper end, was built of brown paper, zoned with yellowish. The envelope was almost simple, remarkably thick, yet very fragile. At Padang, Sumatra, S. LEEFMANS (1922) observed two nests undoubtedly built by *V. affinis* (called by the author *V. cincta* var. *c*). One of these was placed inside the hollow wooden wall of a house and was not examined. The other, hung up in a citrus tree, was carefully studied. After being allowed to grow for several months, it had reached upon removal 35 cm in height and 25 cm in greatest width. At the upper end it was attached to three ramifications of a branch. The outer envelope, mostly of a whitish color, consisted of a number of paper layers, as many as five at the top, some partly fused. The outer layer formed a series of broad channels, never used by the wasps, but probably built for ventilation purposes. The one exit hole, measuring 3.5 by 5 cm, was placed laterally near the lower end. The nest contained five combs of cells measuring successively in diameter 8 cm (lowermost comb), 18 cm, 21 cm, 15 cm, and 10 cm (uppermost comb), the individual cells being 7 to 8 mm wide. The combs were connected by means of a number of paper pillars, in some cases fused into a wall with passage ways. From this nest 215 workers and 10 queens were taken. LEEFMANS' account is illustrated with three excellent photographs.

Heterochromy and Homeochromy. — Like most common and widespread structural species of Diploptera, both *V. tropica* and *V. affinis* exhibit a high degree of heterochromy. They vary from wholly or almost wholly black to extensively or mostly ferruginous and orange-yellow. Thus a number of color forms may be distinguished, some of which were at one time regarded as valid species. While some of these variations are well defined, others are connected by so many transitional specimens that their limits must needs be arbitrary. Usually, but by no means always, the better-marked color forms are more or less geographically segregated. Examples of such precinctive forms are: *V. tropica* var. *eulemoides* in the Andaman Islands; *V. tropica* var. *anthracina* and *V. tropica* var. *philippinensis* in the Philippines; *V. tropica* var. *loochooensis* in the Loo Choo Archipelago; *V. tropica* var. *haematodes*, *V. tropica* var. *ducalis* and *V. affinis* var. *continentalis* in southern Asia (from India to southern China); *V. tropica* var. *trisignata* in the Malay Archipelago; *V. tropica* var. *deusta* in the Philippines, Celebes, Moluccas and New Guinea; *V. affinis* var. *alduini* in the Moluccas, New Guinea and Bismarck Archipelago; *V. tropica* var. *soror* in Formosa, Southern China and Tonkin; *V. tropica* var. *pulchra* in Japan and northern China; *V. affinis* var. *hainanensis* in Hainan; and *V. affinis* var. *picea* in New Guinea. *V. tropica* var. *eulemoides* is the only form of the species known from the Andamans. In all other cases listed above, however, two or more of the color forms of the same structural species are found in the same area and often in the same locality, so that they are not, strictly speaking, "geographical races". To claim that in such cases the several

color forms of the same species are "ecologically" segregated, is a mere surmise which, with the data now available, could be neither proven nor disproven.

A few of the forms of *V. tropica* and *V. affinis* are homeochromic, superficially resembling each other. Such pairs of parallel variations are, for instance: *V. tropica* var. *haematodes* and *V. affinis* var. *continentalis;* and *V. tropica* var. *trisignata* and *V. affinis* var. *indosinensis*. In both these cases, the two members of each pair occur together over at least part of their range, so that there might be some justification for regarding them as "mimics". Homeochromy in some cases extends also to other insects. H. M. PENDLEBURY (1927) states that, in Malacca, "*V. cincta*" is "mimicked" by a syrphid fly, *Milesia vespoides* WALKER. In the Philippines, *V. tropica* var. *deusta* is homeochromic with *Sceliphron luzonensis* ROHWER, a peculiar color form of *Polistes tenebricosus, Eumenes pyriformis* var. *philippinensis* J. BEQUAERT, *Odynerus haemorrhoidalis* var. *ater* (H. DE SAUSSURE) and other wasps. Typical *V. tropica* is homeochromic with *Polistes tenebricosus* var. *hoplites* DE SAUSSURE.

Vespa tropica (LINNAEUS).

Structural Characters. — *Queen and Worker.* — Head (Fig. 1A) moderately swollen behind the eyes, the outer orbit at its widest nearly one and one-half times the width of an eye in profile; occipital margin of vertex straight or very slightly curved inward; oculo-malar space about the length of the fifth antennal segment; interantennal shield semi-elliptical, with bluntly keeled sides; inner orbits about as far apart at the clypeus as on the vertex. Ocelli of normal size, placed close together; the posterior pair about twice as far from the inner orbits as from each other. Clypeus coarsely punctate; anterior margin with a broad, arcuate, median excision, without even a trace of tooth in the middle; the apical edges narrow, bluntly triangular and somewhat bent up-

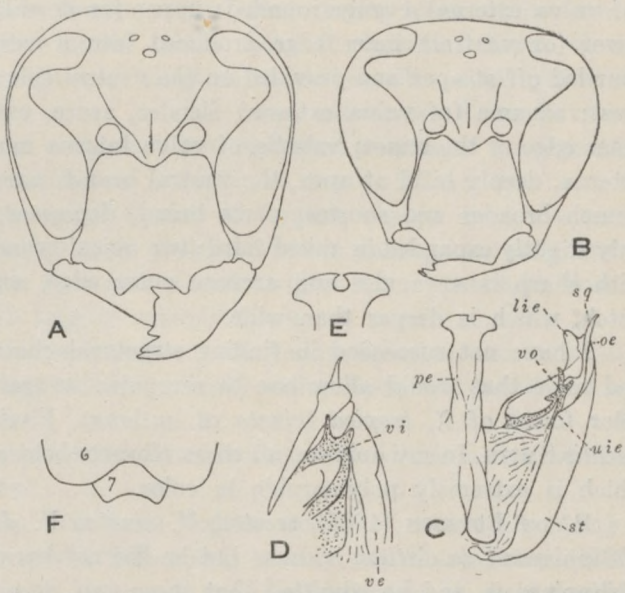


Fig. 1 — *Vespa tropica* (LINNAEUS): A, head of female; B, head of male; C, male genitalia from above (*ve*, valva externa; *st*, stipes; *oe*, outer edge; *uie*, upper or dorsal inner edge; *lie*, lower or ventral inner edge; *sq*, squama; *vi*, valva interna, dotted; *vo*, volsella; *pe*, penis); D, inner view of apex of valva externa and interna; E, apex of penis; F, sixth and seventh abdominal sternites of male.

ward. Fore femora swollen, conspicuously flattened or slightly excavated beneath; the flattened area limited on the outer side by a strong, blunt ridge. Lower, vertical area of pronotum with strong, transverse ribs. Venation: first intercubitus more or less curved; third submarginal cell equally wide above and below, or slightly wider at the radius. Punctures of vertex and thorax of medium strength and rather sparse, the punctures smaller than the intervals; those of the abdomen very scattered. Body thickset; first abdominal tergite not or scarcely narrowed basad. Very large, the fore wing 20 to 30 mm long.

Male. — Like the female, except as follows. Oculo-malar space about half the length of the fourth antennal segment. Clypeus (Fig. 1B) about as long in the middle as wide; its sides nowhere touching the eyes, from which they are separated by exceedingly narrow extensions of the inner orbits; anterior margin almost straight, the apical edges bluntly rounded off. Tyloides on the under side of the antennæ rather low, absent on the third segment; fourth segment, as a rule, with only the basal tyloide distinct; thirteenth segment slightly longer than twelfth. Apex of sixth abdominal sternite (Fig. 1F) with a broad, semi-elliptical excision, rather variable in depth and with the edges curving gradually toward the sides of the hind margin. Seventh tergite straight or faintly curved inward at the apical margin. Apical edges of seventh sternite forming short and broad, rounded, slightly projecting lobes, connected by the slightly curved or almost straight hind margin. Genitalia (Fig. 1 C-E): outer edge of stipes (of valva externa) evenly rounded; upper (or dorsal) inner edge very obtuse; lower (or ventral) inner edge produced into a very broad lobe, irregularly rounded off at apex and provided on the ventral side with a prominent, oblique crest; squama (of valva externa) slender, acute, extending beyond the lower inner edge of the stipes; volsella of valva interna much shorter than the valva externa, deeply bifid at apex, the ventral branch narrow, digitiform, the dorsal branch broader and shorter; penis broad, depressed, the shaft parallel-sided, only slightly expanded in apical third; two apical branches broad, hatchet-shaped with sharp inner angles and arcuate outer edge, separated by a rectangular notch, which is deeper than wide.

I have not succeeded in finding structural characters, in female, worker, and male that would allow one to recognize several valid species among the color forms of *V. tropica* (*cincta* of authors), *V. deusta* LEPELETIER and *V. ducalis* SMITH. In my opinion, all these Hornets belong to one structural species, which is extremely polymorphic in color.

R. DU BUYSSON (1905) treated *V. cincta, V. deusta, V. ducalis* and *V. philippinensis* as distinct species; but he did not know the males of *deusta* and *philippinensis*, and he admitted that these two, at any rate, were perhaps not separable from his *V. cincta*. The male of *V. ducalis* he attempted to separate in his key. At couplet 3, the statement "6e sternite abdominal très profondément échancré" leads to *V. cincta;* the alternative, "6e sternite abdominal légèrement sinué", to *V. ducalis*. In the more detailed description of the male of *V. ducalis*, however, the 6th sternite is said to be "profondément échancré." Males of *V.*

ducalis I have seen have the terminal sternites of the abdomen like those of *V. tropica.*

The difference in the texture of the pilosity used by du Buysson as a specific character is, I believe, due to an illusion. All the several forms here grouped under *V. tropica* have, in addition to the erect, sparse pile, a dense covering of shorter, appressed pubescence. Over the black areas this is black and, in perfectly clean and fresh specimens has a velvety sheen. Over the orange or yellow areas, it is yellow and more or less golden.

Key to the Color Forms of *V. tropica.*

1. Thorax and abdomen wholly or almost wholly black; at most a narrow yellow line at the apex of the second, or more rarely of the first and second tergites; sternites wholly or almost wholly black. Head uniformly black 2.

 Thorax and abdomen, or abdomen only, extensively marked with yellow or orange-yellow; one or more of the tergites almost entirely of that color or with broad apical bands 3.

2. Wings uniformly yellowish-russet, only slightly darker close to the costa var. *deusta* Lepeletier.

 Wings very strongly infuscated (almost black) in the basal half; apical portion yellowish-russet var. *anthracina* J. Bequaert.

3. Abdomen almost entirely orange-yellow; first tergite black or brownish-black, with a yellow apical fascia; head ferruginous; thorax black, blotched with ferruginous; wings infuscate basally, more yellowish apically var. *eulemoides* R. du Buysson.

 Orange or yellow color of abdomen either restricted to some of the segments or forming transverse fasciæ 4.

4. Broad yellowish brown apical fasciæ on tergites one to five, the sixth entirely of that color; basal yellowish-brown fasciæ, narrowly interrupted medially, on first and second tergites var. *esakii* Sonan.

 At least fifth and sixth tergites entirely black 5.

5. First three or four abdominal tergites with yellow apical fasciæ or mostly orange-yellow. Wings rather uniformly yellowish-russet, darker toward base and along costa 6.

 Orange-yellow color of abdomen restricted dorsally to the second or first and second tergites 9.

6. Head and thorax black; first three tergites mostly or extensively orange-yellow (rarely the fourth with apical fascia); sternites almost wholly black var. *philippinensis* H. de Saussure.

 Head mostly or wholly orange-yellow or ferruginous. Thorax more or less marked with yellow or ferruginous; some of the sternites margined with yellow 7.

7. First and second tergites black with a broad apical yellow fascia; their base either entirely black or more or less ferruginous or orange-yellow,

in which case these tergites are tri-colored; third and sometimes fourth tergites with an apical yellow fascia; thorax without or with few pale markings; scutellum black or blotched with ferruginous.
var. *pulchra* (R. DU BUYSSON).

Second tergite bicolored, mostly ferruginous with a broad, yellow, apical fascia; rarely with a darker line faintly separating these two colors; thorax with rather extensive yellow or ferruginous markings; scutellum and postscutellum almost entirely of that color 8.

8. Third tergite and sternite narrowly margined with yellow, the band of the tergite not reaching the sides. Horizontal face of first tergite usually ferruginous at base, broadly yellow at apex, rarely with an intervening black streak; rarely the base somewhat yellowish. var. *ducalis* SMITH.

Third tergite and sternite broadly margined with yellow, the bands of sternite and tergite meeting on the sides. Horizontal face of first tergite broadly yellow at base and apex, the intervening area ferruginous and divided by a narrow black band from the apical yellow area.
var. *loochooensis* J. BEQUAERT.

9. Head mostly or wholly orange-yellow or yellow or ferruginous; first and second tergites with orange or ferruginous base and a broad, apical, yellow fascia, the two separated by a narrow and often ill-defined or interrupted, black cross-band; second sternite yellow at apex and more or less blotched with ferruginous; thorax rather extensively yellow or ferruginous; scutellum and postscutellum often mostly orange-yellow; wings uniformly yellowish-russet var. *soror* R. DU BUYSSON.

Head either entirely black or partly or wholly reddish; first and second tergites, or the second only, almost entirely and uniformly yellow or orange-yellow; wings conspicuously infuscated in basal half, yellowish-russet in apical portion 10.

10. Only the second tergite and sternite mostly or wholly orange or orange-yellow; the first tergite rarely with small yellowish spots or narrow yellow border 11.

In addition to the second segment, the first mostly orange-yellow (at least along the hind margin). Head, antennæ and thorax wholly or almost wholly black var. *trisignata* PÉREZ.

11. Head, antennæ and thorax wholly or almost wholly black.
typical *V. tropica* (LINNAEUS).

Head and antennæ mostly dark blood-red or ferruginous; pronotum and scutellum usually more or less reddish or ferruginous.
var. *haematodes* J. BEQUAERT.

Distribution. — In its several color forms, the structural species *V. tropica* covers the entire Oriental and Indo-Malayan regions, from Ceylon, Bombay and Punjab, in the west, to Korea, southern Manchuria and Japan in the northeast, and to New Guinea and the New Britain Archipelago in the

south-east. It occurs in all the islands of the East Indian Archipelago, as well as in the Andamans. There are no reliable records from Australia and the Solomon Islands, where the Vespinae are apparently entirely lacking.

V. tropica, typical form.

Sphex tropica LINNAEUS, 1758, Syst. Nat., 10th Ed., I, p. 571 ("in Indiis"); 1764, Mus. Ludov. Ulricae, p. 408; 1767, Syst. Nat., 12th Ed., I, pt. 2, p. 945; 1768, Iter in Chinam, p. 4; 1768, Amoenitates Academicae, VII, p. 501 (Java). SULZER, 1776, Abgek. Gesch. Ins., I, p. 192; II, p. 54, Pl. XXVII, fig. 5. GMELIN, 1790, in LINNAEUS' Syst. Nat., 13th Ed., I, pt. 5, p. 2730. G. SHAW, 1806, General Zoology, VI, pt. 2, Pl. XCIII*, fig. "*tropica*".

Vespa tropica W. A. SCHULZ, 1912, Berlin. Ent. Zeitschr., LVII, p. 57 (♀ type).

Vespa cincta FABRICIUS, 1775, Syst. Entom., p. 362 (Malabar); 1781, Spec. Insect., I, p. 458; 1787, Mantissa Insect., I, p. 287. RÖMER, 1789, Genera Insect., p. 60, Pl. XXVII, fig. 5. GMELIN, 1790, in Linnaeus' Syst. Nat., 13th Ed., I, pt. 5, p. 2748. OLIVIER, 1791, Encyclop. Méthod., Insectes, VI, p. 676. FABRICIUS, 1793, Ent. Syst., II, p. 253. DONOVAN, 1800, Epitome Nat. Hist. Ins. India, Pl. LVII. FABRICIUS, 1804, Syst. Piezat., p. 253. JURINE, 1807, Nouv. Méthod. Class. Hym., p. 168 (♀). LATREILLE, 1809, Gen. Crust. Ins., IV, p. 142. LAMARCK, 1817, Hist. Nat. An. sans Vert., IV, p. 88; 1835, *Ibidem*, 2nd Ed., IV, p. 305. LEPELETIER, 1836, Hist. Nat. Ins. Hym., I, p. 505 (☿). BLANCHARD, 1840, Hist. Nat. Ins., III, p. 397, Pl. VI, fig. 6. WESTWOOD, 1842, in DONOVAN's Nat. Hist. Ins. India, 2d Ed., p. 89, Pl. LVII, fig. 1. H. DE SAUSSURE, 1853 - 1855, Et. Fam. Vesp., II, p. 152 (☿). F. SMITH, 1857, Cat. Hym. Brit. Mus., V, p. 118; 1858, Jl. Proc. Linn. Soc. London, Zool., II, p. 116. HORNE, 1870, Trans. Zool. Soc. London, VII, pt. 3, p. 172. ROTHNEY, 1877, Ent. Mo. Mag., XIII, p. 254; 1877, *Ibidem*, XIV, p. 92. GRIBODO, 1884, Ann. Mus. Civ. Genova, XXI, p. 354 (♀). H. LUCAS, 1891, Ann. Soc. Ent. France, LX, Bull. Séances, p. cxviii. DALLA TORRE, 1894, Cat. Hym., IX, p. 140. BINGHAM, 1897, Fauna Brit. India, Hym., I, p. 402, fig. 125 (♀). CAMERON, 1901, Proc. Zool. Soc. London, II, p. 29; 1904, Jl. Straits Br. R. Asiat. Soc., XLI, p. 120. ROTHNEY, 1903, Trans. Ent. Soc. London, pp. 107 and 114. DALLA TORRE, 1904, Gen. Insect., Vespidae, p. 64. ASHMEAD, 1904, Proc. U. S. Nat. Mus., XXVIII, p. 151. R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 490, 495 and 530 (♀ ☿ ♂), Pl. V, fig. 8. CAMERON, 1905, Tijdschr. v. Entom., XLVIII, p. 67. KONINGSBERGER, 1908, Tweede Overzicht Schadel. Nuttige Ins. Java, p. 101. KUROIWA, 1908, Prov. List Hym. Coll. Loochoo, p. 6. MAXWELL-LEFROY and HOWLETT, 1909, Indian Insect Life, p. 216. MATSUMURA and UCHIDA, 1926, Insecta Matsumurana, I, pt. 1, p. 33. PENDLEBURY, 1927, Proc. Ent. Soc. London, I, pt. 3, p. 39. J. BEQUAERT, 1928, Bull. Brooklyn Ent. Soc., XXIII, p. 61. A. v. SCHULTHESS, 1932, Mém. Mus. R. Hist. Nat. Belgique, Hors Série, IV, pt. 5, p. 38. BRISTOWE, 1932, Trans. Ent. Soc. London, LXXX, p. 403. CARL, 1934, Rev. Suisse Zool., XLI, p. 683. A. v. SCHULTHESS, 1935, Rev. Suisse Zool., XLII, p. 298. Not *Vespa cincta* DEGEER, 1773, nor of DRURY, 1773 [3]).

Vespa crabro cincta CHRIST, 1791, Naturgesch. d. Insect., p. 219.

Vespa crabro tenebrionis CHRIST, 1791, Naturgesch. d. Insect., p. 216, Pl. XVIII, fig. 4 (without locality).

[3]) The references here listed under *V. cincta* undoubtedly refer in part to some of the varieties of *V. tropica* or even of *V. affinis*. It seems impossible to sort out those that were only based on the typical form of the species.

The typical form of *V. tropica* occurs over much of the Oriental and Indo-Malayan regions, from India to southern China and the Loo Choo Islands and in the Malay Archipelago as far east as Lombok and Amboina. I can find no reliable record from New Guinea, although the var. *trisignata* occurs there. The specimen seen by R. DU BUYSSON from "Nouvelle-Hollande" must have been wrongly labelled, since no species of *Vespa* is known to occur in Australia. I also attribute to erroneous labelling DU BUYSSON's records from Brazil and Peru. So far as I know, local students of wasps (such as H. and R. VON IHERING, A. DUCKE, SCHROTTKY, DE WINKELRIED BERTONI, etc.) never observed any species of *Vespa* in South America.

I have seen many specimens of typical *tropica* from Tenasserim, Assam, Sikkim, Tonkin, Indo-China, Siam, Penang, Sumatra (Penda Siroen, Soengai Maroewai, 1 ♀, Prince Leopold of Belgium, May 13, 1931; etc.), Nias, Banka, Billiton, Java, Madoera, Lombok and Borneo. It is particularly common in Sumatra, Java and Borneo. I have seen two specimens from the Soeloe (or Jolo) Archipelago (Doedahoe, Jolo Id.; and Bungao Id.); but this form is unknown from the Philippines proper.

W. A. SCHULZ, who examined LINNAEUS' type of *Sphex tropica* at the Zoological Museum in the University of Upsala, found that it was a female of the Hornet generally called *V. cincta* FABRICIUS, and not a Psammocharid, as DAHLBOM believed evidently through a confusion with *Sphex tropica* FABRICIUS. Moreover, the species is clearly recognizable from LINNAEUS' more detailed description in Mus. Ludov. Ulricæ (1764), which mentions, for instance, "corpus magnitudine crabronis.... Oculi lunati.... Antennæ subclavatæ." In a later work (1768), LINNAEUS even states that his *Sphex tropica* has "alae complicatae Vespae." The description of 1764 also leaves no doubt as to which color form must be regarded as typical for the species, since it reads: "Caput atrum.... Thorax niger.... Abdomen nigrum.... Segmentum secundum.... ferrugineum supra et infra." Both SULZER (1776) and SHAW (1806) figure a Hornet as *"Sphex tropica"*; but P. L. MÜLLER's figure of that name is a Psammocharid (1790, in LINNAEUS' Vollst. Natursyst., V, pt. 2, p. 872, Pl. XXVI, fig. 16).

Sphex tropica FABRICIUS (1775, Syst. Entom., p. 350. — America) is not LINNAEUS' species. As shown by the type in the University Museum at Kiel, it is an American Psammocharid, which, Mr. N. BANKS tells me, has not yet been properly recognized. In any case, this insect will have to be renamed, according to the rules. FABRICIUS' species is figured by P. L. MÜLLER (1790) as *Sphex tropica* (see above).

V. tropica var. *haematodes*, new variety.

Female, Worker and *Male*. — Agrees in most respects with *V. tropica*, except that head and antennæ are mostly or entirely dark blood-red or ferruginous; pronotum dorsally and scutellum ferruginous or reddish; mesonotum anteriorly as a rule with two short, ferruginous lines or triangular spots; legs also often

partly reddish-brown; in some specimens the apex of the first tergite is very narrowly yellow.

Specimens Examined. — India: Kooloo, one female *holotype* and one female paratype (M. M. Carleton — M.C.Z.); Amballa, one female paratype (M. M. Carleton — M.C.Z.); Lahore, two female paratypes (Brux. M.); Tranquebar (Berl. M.); Arrarabad (Berl. M.); Basin of the Beeas River, Sub-Himalayas, one female paratype (M. M. Carleton — M.C.Z.). — Ceylon: Nalanda, two female paratypes (W. Horn — M.C.Z. and D.E.I.). — Burma: Pegu, one female paratype (C. H. Carpenter — M.C.Z.). — Sikkim: (Berl. M.). — Annam: (Berl. M.). — China: three female paratypes and one male *allotype*, without more definite locality (M.C.Z.); Amoy, one worker and three female paratypes (Budding — Leid. M.); Pingshiang, Kiangsi, one female paratype (M.C.Z.); Canton (Berl. M.); Hainan (Berl. M.); Ta Hian, Hainan; Dwa Bi, Hainan; Liamui, Hainan; Ta Hau, Hainan (all J. L. Gressitt — M.C.Z.).

I suspect that Fabricius' (1775) description of *V. cincta* was based upon a specimen of the var. *haematodes*, since he says "Thorax niger, maculis duabus utrinque ante alas scutelloque obscuris" and "antennis fuscis." He describes the head as "nigrum", but may well have overlooked the blood-red color. Fabricius' name is not available for this variety in any case, since it is preoccupied by *Vespa cincta* Drury, 1773, and *Vespa cincta* Degeer, 1773. The variety "minor thorace immaculato", supposedly from the Cape of Good Hope (by error), mentioned by Fabricius, is now in the Banksian Collection, at the British Museum. When I saw it, some years ago, I referred it to typical *V. tropica;* but I was not aware then of the true characters of the species, and the specimen may well have been *V. affinis* var. *alduini* Guérin.

The var. *haematodes* is connected with typical *tropica* by individuals in which the thorax is completely black, but the head has a few ferruginous blotches. Such specimens I have seen from Hanoi, Indo-China (where the typical form appears to be more common), southern China and Siam.

V. tropica var. *trisignata* Pérez.

Vespa affinis var. *trisignata* Pérez, 1910, Actes Soc. Linn. Bordeaux, LXIV, p. 8 (8 ♀; Timor).

This form was described as follows: "First segment wholly black anteriorly and on the sides; the dorsal yellow area of first tergite ragged on the sides and cut by three small black lines, one anterior and median, the other two lateral and transverse." One female from New Guinea fits this description perfectly. In other specimens from the same region the black side markings, cutting the yellow area of the first tergite, are much reduced and the median black line is lacking. This leads to specimens having the first tergite almost wholly orange-yellow, except for the black base. At the other extreme of variation, forming the passage to typical *V. tropica*, is the form from the Banda Islands, which Pérez described (but did not name) as follows (1910, *Ibidem*,

p. 8): "The yellow of the first tergite reduced to an apical band, shortened and narrowed on the sides; that of the second segment broadly sinuate anteriorly, shortened on the sides, and provided on each side with a small black, transverse spot, as is seen, more or less vaguely, in the other varieties." This form is homeochromic with *V. affinis* var. *continentalis* and is perhaps worthy of a name. In all specimens of *trisignata* seen, head, antennæ, thorax and legs are uniformly black.

Specimens Examined. — SUMATRA: (Berl. M.). — NIAS: (Berl. M.). — JAVA: (Berl. M.). — SOEMBA: (Berl. M.). — TIMOR: (Berl. M.; Leid. M.). — WETTER ISLAND: (SCHÄDLER — Leid. M.). — BORNEO: (Leid. M.). — CELEBES: Makassar (M.C.Z.); Latimodjong Mts., Bontoe Batoe District, 4500 to 6500 ft. (C. F. CLAGG — M.C.Z.); Tondano-Menado (VAN BRAEKEL — Brux. Mus.); Soemelata (SCHRÖDER — Leid. M.); Gorontalo (ROSENBERG — Leid. M.); Tomohon (BERENDS TEN KATE — Leid. M.). SALAYER ISLAND (Berl. M.). — BANDA: (ROSENBERG — Leid. M.). — AMBOINA: Haroeko (HOEDT — Leid. M.). — HALMAHERA: Ternate (BERNSTEIN — Leid. M.). — BATJAN: (BERNSTEIN — Leid. M.). — CERAM: (Berl. M.); Manipo (HOEDT — Leid. M.). — OBI: (BERNSTEIN — Leid. M.). — WAIGEOE: (BERNSTEIN — Leid. M.). — AROE: (ROSENBERG — Leid. M.). — NEW GUINEA: Fakfak (PALMER — Leid. Mus.); Sakoemi (Prince LEOPOLD of Belgium — Brux. M.); Bongu, K. Wilhelmsland (U.S.N.M.); Arfak Mts. (Berl. M.); Mt. Misim, Morobe District (H. STEVENS — M.C.Z.). — YULE ISLAND: (M.C.Z.). — NEW BRITAIN: (Berl. M.). — NEW POMERANIA: (Berl. M.).

Additional specimens. — SOEMBA: Kananggar and Kambera, 4-700 m (E. & NE. Soemba), Laora, 100 m (N.W. Soemba) (K. W. DAMMERMAN — Buit. M.). — N. CELEBES: 1908 (Buit. M.). — N. CERAM: Koea River, Taloearong (DENIN — Buit. M.). — NEW GUINEA: Mamberamo River, Pionierbivak (W. C. VAN HEURN — Buit. M.).

Specimens named "*V. affinis*" or "*V. cincta* var. *affinis*" in collections, are either true *V. affinis* (LINNAEUS) or *V. tropica* var. *trisignata*, these two forms having been steadily confused. Many of the published records of "*V. affinis*" were undoubtedly based upon specimens of the var. *trisignata*. This is, for instance, the case for the wasps from Sakoemi, New Guinea, recorded by A. v. SCHULTHESS (1932) as *V. cincta* subsp. *affinis*, which I have seen at the Brussels Museum.

V. tropica var. *eulemoides* R. DU BUYSSON.

Vespa eulemoides R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 491 and 530 (☿ ?; Port Blair, Andaman Islands).

Specimens Examined. — ANDAMAN ISLANDS, sixteen females and workers (BINGHAM — Berl. M.).

This wasp, peculiar to the Andamans, is an extreme xanthic color form of *V. tropica*, connected with the var. *affinis* by means of the var. *philippinensis*.

V. tropica var. *deusta* Lepeletier.

Vespa deusta Lepeletier, 1836, Hist. Nat. Ins. Hym., I, p. 506 (☿; locality unknown). H. de Saussure, 1853 - 1855, Et. Fam. Vesp., II, p. 149 (♀). F. Smith, 1857, Cat. Hym. Brit. Mus., V, p. 121. Kirsch, 1878, Mitth. Zool. Mus. Dresden, III, p. 381 (☿ ♀). Dalla Torre, 1894, Cat. Hym., IX, p. 145; 1904, Gen. Insect., Vespidae, p. 65. Ashmead, 1904, Proc. U.S. Nat. Mus., XXVIII, p. 151. R. du Buysson, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 489 and 528 (☿ ♀). Meade-Waldo, 1915, Repts. Brit. Ornithol. Union Exp. Dutch New Guinea, I, pt. X, p. 15 (♀). F. X. Williams, 1919, Hawaiian Sugar Planters' Assoc. Expt. Sta., Ent. Ser., Bull. No. 14, p. 165, fig. 95 (♀); 1928, Philippine Jl. Sci., XXXV, p. 78 [4]).

Vespa unicolor F. Smith, 1863, Jl. Proc. Linn. Soc. London, Zool., VII, p. 44 (♀; Boeroe). Dalla Torre, 1894, Cat. Hym., IX, p. 157; 1904, Gen. Insect., Vespidae, p. 66. R. du Buysson, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 4, p. 620.

Specimens Examined. — Philippine Islands: Manila (R. C. Mc Gregor — M.C.Z.; Berl. M.); Los Baños, Luzon (Phil. Agri.; Phil. B. Sci.); Mt. Maquiling, up to 1000 m, Luzon (Phil. Agri.); Mt. Banahao, Laguna, Luzon (Phil. B. Sci.); Rizal, Novaliches, Luzon (W. Schultze — Phil. B. Sci.); Calapan, Mindoro (P. de Mesa — M.C.Z.); Lubang (P. de Mesa — M.C.Z.); Mindanao (Brux. M.); Mt. Halcon, Mindoro (E. D. Merrill — Phil. B. Sci.); Puerto Galera, Mindoro (S. M. Cendaña — Phil. Agri.); San Juan, La Union, Luzon (J. Fontanilla — Phil. Agri.); Zamboanga, Mindanao (M.C.Z.); Bayombong, Luzon (Phil. Agri.). — Boeroe: (Hoedt and Bernstein — Leid. M.).

Additional specimens. — Boeroe: (Denin — Buit. Mus.); Kajeli Bay (Zadelhoff 1928 — Buit. Mus.).

This variety is known from the Philippines, Celebes, Boeroe Island (one of the Moluccas) and Dutch New Guinea (Setakwa River; recorded by Meade-Waldo). R. du Buysson's record from Sumatra appears to me open to doubt.

The queens and males usually have narrow yellow apical margins on the first and second tergites, or on the second only; these margins are often lacking in the workers.

V. unicolor is identical with *deusta*, which I have seen from Boeroe. Smith's description agrees with my specimens of *deusta* and Dr. J. van der Vecht, who recently saw Smith's type at the Oxford University Museum, writes me that it is a uniformly black form of *V. tropica*. It should be noted that Smith did not compare *unicolor* with true *deusta*. He states that in *deusta*, "the eyes extend to the base of the mandibles", which is erroneous.

V. tropica var. *anthracina*, new variety.

Female, Worker and *Male.* — This form is much like the var. *deusta* in appearance, but differs strikingly in the color of the wings, which are blackish-brown to black in the basal two-thirds, ferruginous-subhyaline in the apical third, the two areas gradually fusing. In addition, the body is, as a rule, wholly

[4]) Some of the references listed for *deusta* may have been based in part upon specimens of the var. *anthracina*.

black, although exceptionally there are two short, orange lines along the apical margin of the second tergite. Two females, at the Berlin Museum and the M.C.Z., have not only an apical band, but also two small orange transverse spots on the second tergite and the second sternite spotted.

Specimens Examined. — PHILIPPINE ISLANDS: Sibuwan, one worker *holotype*, one worker paratype, and one male, *allotype* (F. C. BAKER — U.S. N.M.); Puerto Princesa, Palawan, worker paratypes (R. C. MCGREGOR — U.S.N.M.; Phil. B. Sci.; M.C.Z.); Palawan, one female paratype (DOHERTY — Berl. M.); Palawan-Backuit, three worker paratypes (Prince LEOPOLD of Belgium — Brux. M.); Mindanao, worker paratypes (U.S.N.M.); Zamboanga, Mindanao, queen and worker paratypes (U.S.N.M.) M.C.Z.); Dapitan, Mindanao, worker paratypes (U.S.N.M.); Surigao, Mindanao, two worker paratypes (F. C. BAKER — U.S.N.M.); Calian, Davao Prov., Mindanao, three queen paratypes (C. F. CLAGG — M.C.Z.); Lawa, Davao Prov., Mindanao, one queen paratype (C. F. CLAGG — M.C.Z.); Culasi, Panay, one female paratype (MC GREGOR); two female paratypes, without more definite locality (Brux. M.).

At the U. S. National Museum I found, in the F. C. BAKER Collection, many specimens of this form placed under the MS name "*Vespa deusta* var. *anthracina* GRIBODO." This name I have retained because most likely it was used in GRIBODO's collection and may have been distributed by him to other Museums.

The var. *anthracina* is known only from the Philippines, where it appears to be as common as the var. *deusta*, with which it has been thus far confused.

V. tropica var. *philippinensis* H. DE SAUSSURE.

Vespa philippinensis H. DE SAUSSURE, 1853-1855, Et. Fam. Vesp., II, p. 148 (♂; Philippines). F. SMITH, 1860, Jl. Proc. Linn. Soc. London, Zool., V, p. 131; 1863, *Ibidem*, VII, p. 44. DALLA TORRE, 1894, Cat. Hym., IX, p. 152; 1904, Gen. Insect., Vespidae, p. 65. R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 489 and 529 (♀).

Specimens Examined. — PHILIPPINE ISLANDS: Surigao, Mindanao, one worker and one male (F. C. BAKER — U.S.N.M.); Ubay, one female (SEMPER — Par. M.); Luzon, one female (Berl. M.); Mauo River, Samar Island (Prince LEOPOLD of Belgium — Brux. M.); Samar Island (F. C. BAKER); Oquendo, Samar Id. (Phil. B. Sci.); Negros (Prince LEOPOLD of Belgium — Brux. M.); Canlawan, Negros, one female and one male (C. S. BANKS — Phil. B. Sci.); Maao, Negros Occidental (C. S. BANKS — Phil. B. Sci.); Los Baños, Luzon (C. P. DOLORES — Phil. B. Sci.).

This form is widespread in the Philippines, but apparently rather rare. SMITH's (1860 and 1863) records from Boeroe and Amboina need confirmation.

V. tropica var. *ducalis* F. SMITH.

Vespa ducalis F. SMITH, 1852, Trans. Ent. Soc. London, (2) II, p. 39 (☿ ♀♂; Tein-tung naar Ning-po-foo, China). H. DE SAUSSURE, 1853-1855, Et. Fam. Vesp., II, p. 151 (☿ ♀♂). F. SMITH, 1857, Cat. Hym. Brit. Mus., V, p. 121; 1873, Trans.

Ent. Soc. London, pt. 2, p. 197. Dalla Torre, 1894, Cat. Hym., IX, p. 145. Bingham, 1897, Fauna Brit. India, Hym., I, p. 401 (☿ ♀ ♂). R. du Buysson, 1903, Bull. Mus. Hist. Nat. Paris, IX, p. 127. Dalla Torre, 1904, Gen. Insect., Vespidae, p. 65. R. du Buysson, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 518 and 627 (☿♀♂), Pl. XIII (nest). Maxwell-Lefroy and Howlett, 1909, Indian Insect Life, p. 216.

Specimens Examined. — China: Tsing-Tau (Berl. M.); Canton (Berl. M.); Hongkong (Berl. M.); Yen-Ping, one female, Tcheng-Ting-Fou, Tche-ly, one worker; Foochow, one female (C. R. Kellogg — M.C.Z.); Pingshiang, Kiangsi (Kreyenberg); southeastern Ngan-Hoei (Par. M.); Tse-Kou, Yunnan (Par. M.). — Siam: (Par. M.). — Sikkim: (Berl. M.).

Originally described from southern China (not northern China as erroneously given by Smith), this form has also been recorded from northern India (Nepaul, Assam), Burma, Siam and Tonkin.

Published records of *"ducalis"* from Formosa were based upon specimens of the var. *soror* R. du Buysson; those from Japan, northern China and Manchuria are referable to the var. *pulchra* R. du Buysson, and those from the Loo-Choo Islands to the var. *loochooensis* J. Bequaert.

An aberrant specimen from Sikkim, at the Berlin Museum, has the first tergite ferruginous anteriorly, black in the middle, and narrowly yellow at apex; the second tergite is broadly yellow at apex, otherwise black with a dull russet band broadly interrupted in the middle; the third tergite has an apical yellow band. Other specimens from Sikkim have the more usual *ducalis* color markings.

V. tropica var. *loochooensis*, new variety.

Vespa ducalis Kuroiwa, 1908, Prov. List Hym. Coll. Loochoo, p. 6. Not of F. Smith, 1852.

Female or Worker. — Head mostly dull yellow, with most of the mandibles and a broad, diffuse spot on the frons near the ocelli, chestnut-brown; the apical portion of the mandibles black. Antennæ chestnut-brown, the scape yellow beneath. Thorax black; prothorax, tegulæ and scutellum blotched with ferruginous-brown; anterior edge of pronotum and postscutellum yellow, the hind part of the scutellum also somewhat yellowish. First abdominal segment ferruginous, the horizontal portion of the tergite broadly yellow at the base, then with a ferruginous cross-band, broadly yellow at apex, the apical yellow portion separated from the ferruginous area by a narrow blackish streak which does not reach the sides and is more or less divided in the middle. Second segment with basal two-thirds ferruginous, apical third yellow; no intervening black area. Third segment black with a broad and continuous yellow apical fascia. Succeeding segments black, the fourth sternite with a narrow, more or less distinct, apical yellowish band. Legs brownish-black, blotched with ferruginous, the fore tibiæ yellowish on the outer side. Wings as in the var. *ducalis*.

Holotype female (or worker) and two paratype females (or workers) from Iriomote Island, in the LOO-CHOO (or Riu-Kiu) ARCHIPELAGO, August 25, 1934 (L. GRESSITT — M.C.Z.).

This peculiar local form from the Loo-Choo Islands curiously enough is nearer the var. *ducalis*, from southern China, than to the var. *pulchra*, from northern China and Japan, and the var. *soror*, from Formosa.

V. tropica var. *soror* R. DU BUYSSON.

Vespa ducalis var. *soror* R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 490 and 519 (☿ ♀; Chi-fu, China; Kiang-Si, China; Bac-Kan, Tonkin; Than-Moi, Tonkin; Phuc-Son, Annam; Khasia Hills, India; no type locality designated) [5]. RENGEL, 1917, Arch. f. Naturgesch., LXXXII, Abt. A, Heft 5, (1916), p. 120 (☿ ♀).

Vespa ducalis ROHWER, 1911, Proc. U. S. Nat. Mus., XXXIX, p. 479. SONAN, 1929, Trans. Nat. Hist. Soc. Formosa, XIX, pp. 137 and 138 (♀♂). ESAKI, 1932, Iconogr. Insect. Japon., p. 302, fig. (♀). Not of F. SMITH, 1852.

Specimens Examined. — FORMOSA: Mareppa; Mizuho, Rokki; Bukai; Kuraru; Hori; Suisha; Hassenzan; numerous specimens (L. GRESSITT — M.C.Z.); Kosempo (H. SAUTER); Taihanroku (H. SAUTER — Leid. M.); Horisha. — CHINA: Kiang-Si; Koui-Tscheou (Par. M.); Hainan (Ta Hian; Ta Hau; Dwa Bi — J. L. GRESSITT). — TONKIN: Bac-Kan; Than-Moi (Par. M.).

The specimens from the Paris Museum listed above were co-types.

ESAKI's figure of *"V. ducalis"* is clearly the var. *soror*, which appears to be a characteristic Hornet of Formosa, southern China and Indo-China.

V. tropica var. *soror* is homeochromic with a peculiar (apparently unnamed) color form of *Vespa mandarinia* SMITH, occurring together with it. No doubt the two have often been confused. They may be readily separated by the differently shaped clypeus and head, as well as by the legs, which in *V. mandarinia* are very robust.

V. tropica var. *pulchra* R. DU BUYSSON.

Vespa ducalis var. *pulchra* R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, p. 519 (☿ ♀; Yokohama, Japan; a variation from Seoul, Korea). MATSUMURA, 1911, Thousand Insects Japan, Suppl. III, p. 99, Pl. XXXVIII, fig. 4 (♀). RENGEL, 1917, Arch. f. Naturgesch., LXXXII, (1916), Abt. A, Heft 5, p. 121. MATSUMURA and UCHIDA, 1926, Insecta Masumurana, I, pt. 1, p. 32.

Vespa ducalis BIRULA, 1925, Arch. f. Naturgesch., XC, (1924), Abt. A, Heft 12, pp. 91 and 97 (☿ ♀♂). Not of F. SMITH, 1852.

Vespa flavofasciata MATSUMURA, 1911, Thousand Insects Japan, Suppl. III, p. 100, Pl. XXXVIII, fig. 6 (♀); 1930, Illustr. Thous. Ins. Japan, II, p. 3, Pl. I, fig. 6 (♀); 1931, 6000 Ill. Ins. Japan-Empire, p. 12, fig. (♀). Not of CAMERON, 1903.

Vespa matsumurai SONAN, 1935, Trans. Nat. Hist. Soc. Formosa, XXV, p. 370, figs. 1-3 (♀); Tokyo, Japan.

[5]) The specimens from Bombay included by R. DU BUYSSON under his var. *soror* were examined at the Paris Museum; they belong to the typical form of *V. affinis*. I have not seen what he recorded as *soror* from Khasia Hills.

Specimens Examined. — Japan: Saitama, Konshu, one female (T. Fukai); Kanagawa, one worker and one male; Oshima Island, one female (S. Yamamoto); Tottori, Konshu, one female (S. Yamamoto); Tokio (L. Gressitt — M.C.Z.); Kofou (Par. M.); Yokohama, cotypes (Par. M.). — China: Tche-ly (Par. M.). — Manchuria: two workers sent by K. Yasumatsu.

The var. *pulchra* is distributed over Japan, Korea, Manchuria, northern China and the Ussuri district of eastern Siberia. It varies much in the extent of yellow on the four anterior tergites, especially that of the fourth which may be entirely black or have a very narrow or a rather broad apical fascia. One specimen, from Tokyo, has the bases of first and second tergites entirely black; usually, though, these bases bear an orange or ferruginous-yellow fascia, which is sometimes interrupted in the middle. Sonan's *V. matsumurai* hardly differs from du Buysson's Japanese specimens of *pulchra*.

V. tropica var. *esakii* Sonan.

Vespa esakii Sonan, 1935, Trans. Nat. Hist. Soc. Formosa, XXV, p. 371, figs. 4-6 (♀; Izuhara in Tsushima Islands, between Japan and Korea).

This form, known only from the type locality, is evidently very closely related to the var. *pulchra*, from which it differs only in having an orange apical fascia on the fifth tergite also and the sixth tergite entirely of that color. I have not seen it; but the description leaves little doubt that it is a color form of *V. tropica*. It is homeochromic with *V. mandarinia* var. *magnifica* Smith.

Vespa affinis (Linnaeus).

Structural Characters. — *Queen and Worker.* — Oculo-malar space (Fig. 2A) about half the length of the sixth antennal segment; interantennal shield triangular, with more sharply keeled sides. Posterior ocelli about one and one-half times as far from the inner orbits as from each other. Anterior margin of clypeus with a rather narrow but deep, arcuate, median excision; the apical edges low, very broad, evenly arcuate, passing gradually into the median excision, but ending abruptly on the outer side. Fore femora swollen, but not conspicuously flattened beneath and without strong, blunt ridge on the outer side.

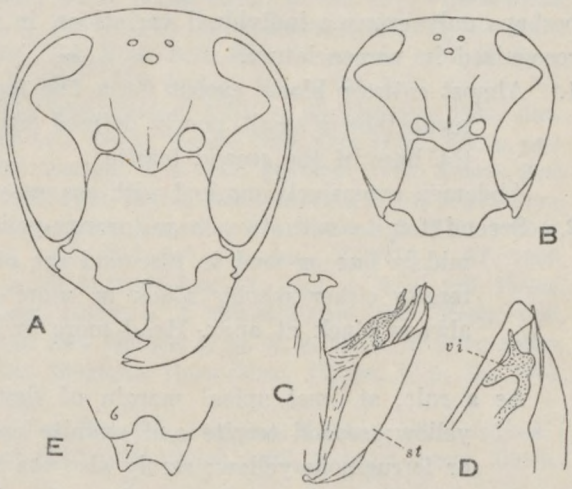


Fig. 2. — *Vespa affinis* (Linnaeus); A, head of female; B, head of male; C, male genitalia from above (lettering as in Fig. 1); D, inner view of apex of valva externa and interna; E, sixth and seventh abdominal sternites of male.

Venation: first intercubitus usually straight. Punctures of vertex, thorax and abdomen of medium strength, but very close together, producing a more coarsely granulose sculpture (the contrast with *V. tropica* is especially sharp on propodeum and postscutellum). Body more slender, the first abdominal tergite markedly narrowed basad. Smaller, the fore wing 15 to 23 mm long. The remainder as in *V. tropica*.

Male. — Oculo-malar space (Fig. 2B) about one-half the length of the seventh antennal segment. Clypeus slightly wider than long; its sides touching the eyes over about the lower half; anterior margin slightly curved inward (more so than in *V. tropica*), the apical edges very broadly rounded off. Tyloides on the under side of antennæ quite pronounced; a pair present on fourth segment; third segment also with a tyloide near apex; thirteenth segment hardly or not longer than twelfth. Sixth abdominal sternite (Fig. 2E) at apex with a rather narrow, semi-circular excision, the edges of which form sharp angles with the sides of the hind margin. Seventh tergite with a short, sharp, median, apical notch. Apical edges of seventh sternite much produced, bluntly triangular, the hind margin forming a deep, even, bow-like inward curve. Genitalia (Fig. 2C-D) essentially as in *V. tropica*, the slight differences shown in the drawings being largely due to the different position and spreading of the parts; squama short, acute, barely extending beyond the lower inner edge of the stipes; volsella of valva interna not bifid, ending ventrally in a narrow, digitiform lobe, dorsally in a blunt angle; penis shaped much as in *V. tropica*, but the shaft relatively shorter and slightly expanded in its apical third.

V. affinis is almost as variable in color as *V. tropica*. Names are available for four of the six color forms recognized in the subjoined key. All forms are rather poorly defined and connected by transitional specimens; and some are perhaps only extreme individual variations, in which case they should not be recognized in nomenclature.

1. Almost entirely black, except for a few ferruginous blotches on head and tegulæ and a small, poorly defined ferruginous spot on each side near the base of the second tergite var. *picea* R. DU BUYSSON.

 Abdomen extensively marked with orange-yellow 2.

2. Second tergite with two large, orange-yellow spots, which touch on the middle line or tend to fuse and are often blotched with brown; first tergite either wholly black or more or less orange-yellow basally, always black at apex. Head more or less ferruginous. Thorax black. var. *alduini* GUÉRIN.

 As a rule, at least apical margin of first tergite marked with orange-yellow; second tergite and sternite entirely or mostly orange-yellow or ferruginous-yellow; rarely also the third tergite of that color ... 3.

3. Orange-yellow color of first tergite reduced to a narrow apical margin or almost lacking; remainder of first tergite either black or slightly dull ferruginous. Head black or ferruginous. Thorax and legs black or reddish var. *continentalis* J. BEQUAERT.

First tergite extensively orange-yellow; the base bright ferruginous-red or black 4.

4. Thorax wholly black or with very faint ferruginous blotches on the pronotum. Head black or more or less dull ferruginous. Legs mostly black. var. *indosinensis* PÉREZ.

Head and antennæ mostly bright ferruginous-red; mesonotum either black or blotched with ferruginous 5.

5. Only first and second tergites orange-yellow; usually base of first extensively ferruginous typical *V. affinis* (LINNAEUS).

Third tergite also extensively orange-yellow. var. *hainanensis* J. BEQUAERT.

Distribution. — The structural species *V. affinis* appears to occur throughout most of southern Asia and the Malay Archipelago, though not as widely as *V. tropica*. It is known definitely from western India (Mangalore; Bombay; Calcutta; Himalaya) and Ceylon in the west, to Central China (Kiangsi and Fokien), Formosa and the Loo-Choo Islands in the northeast, and to New Guinea in the southeast. It does not, however, occur in all the East Indian islands. As was pointed out to me by Dr. J. VAN DER VECHT, it is unknown in Java. It does not reach Japan.

V. affinis, typical form.

Apis affinis LINNAEUS, 1764, Mus. Ludov. Ulricae, p. 417 ("In calidis regionibus"). DALLA TORRE, 1896, Cat. Hym., X, p. 586.

Vespa affinis FABRICIUS, 1787, Mantissa Insect., I, p. 287 (China; described as a new species). GMELIN, 1790, in Linnaeus' Syst. Nat., 13th Ed., I, pt. 5, p. 2748. OLIVIER, 1791, Encyclop. Méthod., Insectes, VI, p. 677. FABRICIUS, 1793, Entom. Syst., II, p. 253; 1804, Syst. Piezat., p. 254. LATREILLE, 1806, Gen. Crust. Ins., IV, p. 142, JURINE, 1807, Nouv. Méth. Class. Hym., p. 168 (♀♂). LEPELETIER, 1836, Hist. Nat. Ins. Hym., I, p. 506 (☿). H. DE SAUSSURE, 1853-1855, Et. Fam. Vesp., II, p. 154. F. SMITH, 1857, Cat. Hym. Brit. Mus., V, p. 118; 1857, Jl. Proc. Linn. Soc. London, Zool., II, p. 116; 1858, *Ibidem*, III, p. 23; 1861, *Ibidem* VI, p. 59; 1863, *Ibidem*, VII, p. 43; 1865, *Ibidem*, VIII, p. 89. GRIBODO, 1884, Ann. Mus. Civ. Genova, XXI, p. 355 (☿). DALLA TORRE, 1894, Cat. Hym., IX, p. 136. CAMERON, 1901, Proc. Zool. Soc. London, I, p. 241. ROTHNEY, 1903, Trans. Ent. Soc. London, p. 107. W. A. SCHULZ, 1912, Berlin. Ent. Zeitschr., LVII, p. 57 (type).

Vespa cincta var. *affinis* R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, p. 534 (☿ ♀♂). CAMERON, 1905, Tijdschr. v. Entom., XLVIII, p. 67; 1906, Nova Guinea, V, Zool., pt. 1, p. 59; 1911, *Ibidem*, IX, Zool., pt. 2, p. 186. PÉREZ, 1910, Actes Soc. Linn. Bordeaux, LXIV, p. 7. MEADE-WALDO, 1915, Repts. Coll. Brit. Ornith. Union Exp. Dutch New Guinea, I, pt. X, p. 15. A. v. SCHULTHESS, 1932, Mém. Mus. R. Hist. Nat. Belgique, Hors Série, IV, pt. 5, p. 38; 1935, Rev. Suisse Zool., XLII, p. 298.

Vespa formosana SONAN, 1927, Trans. Nat. Hist. Soc. Formosa, XVII, p. 125 (Formosa); 1929, *Ibidem*, XIX, pp. 137 and 145 (☿♀♂). ESAKI, 1932, Iconogr. Insect. Japon., p. 304, fig. (♀).

Vespa bicolor MATSUMURA, 1911, Thousand Insects of Japan, Suppl. III, p. 103, Pl. XXXVIII, fig. 12. Not of FABRICIUS 1787.

Vespa cincta var. *c* LEEFMANS, 1922, De Tropische Natuur, XI, p. 125, figs. 1 - 4 and 6 - 8 (nest).

Some of the foregoing references cover also specimens of the var. *indosinensis* PÉREZ; while others were based, in part at any rate, upon specimens of *V. tropica* var. *trisignata* PÉREZ, which in color resembles typical *V. affinis* and its var. *indosinensis*.

Specimens Examined. — CHINA: Pingshiang, Kiangsi (KREYENBERG); Loh Hong (C. W. HOWARD); Canton (C. W. HOWARD); Paak Shui Kong (C. W. HOWARD); White Cloud (C. W. HOWARD); Amoy (S. F. LIGHT); Kaichek, Hainan (C. F. LIGHT); Foochow (GIST GEE and C. R. KELLOGG); Hainan Island (2 miles S.W. of Nodoa, June 28, 1929; S. of Nodoa, July 9, 1929; and Woh-Hau-Chuen, E. of Nodoa, July 3, 1929 (W. E. HOFFMANN). — Liamui; Ta Hau; Ta Hian; Dome Mt.; Hoihow; Dwa Bi; Nodoa (J. L. GRESSITT). — FORMOSA: Takao (SAUTER — Leid. M.); Hu Sia. — LOO CHOO ARCHIPELAGO: Iriomote Island (L. GRESSITT). — CEYLON: (W. McM. WOODWORTH). — INDIA: Calcutta (BRUNETTI); Himalaya (FELDER — Leid. M.). — NORTHERN SUMATRA: (G. FAIRCHILD). — BORNEO: Balikpapan (Prince LEOPOLD of Belgium. — Brux. M.). — CELEBES: Toli-Toli (Brux. M.). — MOLUCCAS: Ternate (Prince LEOPOLD of Belgium — Brux. M.). — BATJAN (Brux. M.). — SOELOE (or Jolo) ARCHIPELAGO: Bongao Id. near Tawi Tawi (A. DUYAG — Phil. B. Sci.).

Additional specimens. — N. CELEBES: 1908 (Buit. M.). — TALAUD: Karakelang, Beo, 1920 (ERIE — Buit. M.). — OBI: Laiwoei (DENIN — Buit. M.). NEW GUINEA: Hollandia (K. GJELLERUP — Buit. M.); Mamberamo River, Prauwen bivak (W. C VAN HEURN — Buit. M.).

W. A. SCHULZ (1912) examined the type of *Apis affinis* at the Zoological Museum of the University of Upsala. He recognized that it was a *Vespa*, identical with FABRICIUS' *Vespa affinis*, which he regarded as a color variety of *V. tropica* (LINNAEUS). There are several statements in LINNAEUS' original description which make the identification certain. He says "Caput.... obscure testaceum.... Labium [= clypeus] obtusum.... Thorax.... obsolete testaceus.... Segmenta 1.2. [of abdomen].... corpori [= head and thorax] concoloria, secundo tamen pallidiore.... Segmenta reliqua nigra. Pedes obsolete ferruginei.... Affinitas facie et habitu antecedentis *Sphegis tropicae*, [6])... licet color alius et magnitudo inferior...." These characters are not found in the form of *V. tropica* having the two basal tergites orange-yellow (var. *trisignata* PÉREZ). All the specimens of that form I have seen have the head and thorax entirely black and, moreover, are of the size of typical *V. tropica*.

Specimens with the thorax almost completely ferruginous-red are common in Formosa, where they were described by SONAN as *V. formosana*. Since this coloration is found also in China and even in Ceylon, and since it is connected by many intermediate stages with the more usual form, in which the mesonotum is entirely black, I do not give *formosana* even varietal rank. Moreover, LINNAEUS' type appears to have been a wasp with the thorax mostly ferruginous.

[6]) From this statement it would seem that LINNAEUS intended his *"affinis"* to follow *Sphex tropica*, but that through an oversight it was inserted after his *"Apis tropica"*.

It is interesting to note that typical *affinis* occurs in the western part of the Soeloe Archipelago, but is unknown from the Philippines proper.

V. affinis var. *hainanensis*, new variety.

Female or Worker. — Head and antennæ ferruginous-red; only the upper margin of clypeus and teeth of mandibles black. Thorax ferruginous-red; mesonotum, anterior half of mesopleura, upper half of metapleura, hind half of postscutellum, and middle of propodeum black. Legs fuscous; femora more reddish on the inner side and more blackish on the outer side. Wings rather uniformly tinged with ferruginous. First abdominal tergite orange-yellow with ferruginous base; second orange-yellow; third more brownish orange-yellow, with a black base and an apical infuscate cross-band which on each side ends far from the lateral margins in an anterior expansion. Second sternite diffusely yellowish in apical half.

China: Hainan Island, one female or worker *holotype* (2 miles south of Nodoa, June 25, 1929; W. E. Hoffmann — M.C.Z.).

This peculiar variation somewhat parallels in color *V. tropica* var. *philippinensis*. Pérez (1910) describes a similar specimen, from Cochinchina, as a variation of his *V. indosinensis*.

V. affinis var. *indosinensis* Pérez.

Vespa unifasciata Olivier, 1791, Encyclop. Méthod., Insectes, VI, p. 677 ("Indes orientales"). Not *Vespa unifasciata* Gmelin, 1790.

Vespa nigripennis H. de Saussure, 1853-1855, Et. Fam. Vesp., II, p. 156 (no sex; Philippines). F. Smith, 1857, Cat. Hym. Brit. Mus., V, p. 121. Dalla Torre, 1894, Cat. Hym., IX, p. 150; 1904, Gen. Insect., Vespidae, p. 65. Ashmead, 1904, Proc. U.S. Nat. Mus., XXVIII, p. 151. R. du Buysson, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 4, p. 620. Not *Vespa nigripennis* Degeer, 1773.

Vespa indosinensis J. Pérez, 1910, Actes Soc. Linn. Bordeaux, LXIV, p. 8 (♂ or ♀; Cochinchina; Annam; Malacca; northern Celebes; India; type locality not designated.

Specimens Examined. — Indo-China: Hanoi (W. Demange). — Federated Malay States: Penang; Singapore. — Sumatra: Medan (G. Fairchild; v. d. Meer Mohr); Padang (Prince Leopold of Belgium — Brux. M.); Tandjong Bringin Est., Langkat (Jourin); Poeloe Weh (Buitendijk — Leid. M.); Tandjong Morawa, Serdang (B. Hagen — Leid. M.); Solok (P. Stolz — Leid. M.); Palembang (Wienecke — Leid. M.); Sawahloentoe, Padangsche Bovenlanden (Mej. Delprat — Leid. M.). — Simaloer: Kaloeng and Sibolga (E. Jacobson). — Nias: (Kleiweg de Zwaan — Leid. M.). — Enggano Island: (Wienecke — Leid. M.). — Banka: (Budding — Leid. M.). — Borneo: (Schwaner — Leiden M.). — Philippine Islands: Zamboanga, Mindanao (M.C.Z.); Mauo River, Samar Id.; Palawan-Backuit (Prince Leopold of Belgium — Brux. M.), Puerto Princesa, Palawan (R. C. McGregor — Phil. Bur. Sci.); Iwahig, Palawan (C. M. Weber — Phil. Bur. Sci.); Dumaran Id. (W. Schultze — Phil.

Bur. Sci.). — CELEBES: Toli-Toli (H. FRUHSTORFER); Gorontalo (ROSENBERG — Leid. M.); Bolaäng Mongondow (W. KAUDERN — Leid. M.); Tomohon (BERENDS TEN KATE — Leid. M.). — HALMAHERA: northern part (BERNSTEIN — Leid. M.). — TERNATE: (T. BARBOUR; BERNSTEIN — M.C.Z.; Leid. M.). — AMBOINA: (Prince LEOPOLD of Belgium. — Brux. M.; HOEDT. — Leid. M.). — SALAWATTI: (BERNSTEIN — Leid. M.). — AROE: (ROSENBERG — Leid. M.). — WAIGEOE: (Mrs. DE BEAUFORT). — NEW GUINEA: Manokwari; Mianonwooi (T. BARBOUR).

Additional Specimens. — SUMATRA: Atjeh, Singkel (M. E. WALSH — Buit. M.); Padang (C. BODEN KLOSS & H. SMEDLEY — Buit. M.). — MENTAWEI ARCHIP.: Siberoet & Sipora (C. BODEN KLOSS & H. SMEDLEY — Buit. M.). — Strait Soenda: Sebesi (K. W. DAMMERMAN — Buit. M.).

V. affinis var. *continentalis*, new variety.

Female and Worker. — Head black or more or less ferruginous-red or reddish-brown; mandibles always black. Thorax and legs black, or the thorax more or less ferruginous; tegulæ somewhat reddish. Abdomen black or somewhat ferruginous on first tergite, with the second tergite almost entirely and the second sternite extensively orange-yellow; first tergite with a narrow and irregular yellow apical margin, often effaced on the sides and interrupted medially. Wings blackish-brown in basal half, much clearer and russet in apical half.

Specimens Examined. — INDIA: Mangalore, female *holotype* (J. C. BRIDWELL — U.S.N.M.); Shembaganur near Madura, two worker paratypes; three worker paratypes without more definite locality (C. V. PIPER — U.S.N.M. and M.C.Z.) — TENASSERIM: Papun, several worker paratypes (BINGHAM — Berl. M.). — CEYLON: Colombo, one worker paratype (Berl. M.); Negombo, two female paratypes (W. HORN — M.C.Z. and D.E.I.); Kandy, one female paratype (W. HORN — M.C.Z.); eight worker or female paratypes without more definite localities (Berl. M.). — SIAM: Trong, Lower Siam (W. L. ABBOTT — U.S.N.M.).

The specimens from Ceylon differ from most of those from continental India in being extensively reddish on the thorax. It seems hardly possible to separate them as a distinct variety, since the specimens from Tenasserim show somewhat the same type of coloration.

V. affinis var. *alduini* GUÉRIN.

Vespa alduini GUÉRIN-MÉNEVILLE, 1851, in DUPERREY, Voyage de la Coquille, Zool., Atlas, Insectes, Hymén., Pl. IX, fig. 6 (1838, Texte, II, pt. 2, 1st Div., p. 264, as a synonym of *V. bimaculata*). H. DE SAUSSURE 1853-1855, Et. Fam. Vesp., II, p. 154 (♂). F. SMITH, 1863, Jl. Proc. Linn. Soc. London, Zool., VII, p. 43. J. BEQUAERT, 1926, Ent. Mitt., Berlin, XV, p. 192.

Vespa cincta var. *alduini* R. DU BUYSSON, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, p. 536 (☿).

Vespa bimaculata Guérin-Méneville, 1838, in Duperrey, Voyage de la Coquille, Zool., II, pt. 2, 1st Div., p. 264 (no sex given; Boeroe Island; substitute name for *V. alduini*). Dalla Torre, 1894, Cat. Hym., IX, p. 139; 1904, Gen. Insect., Vespidae, p. 64. Not *Vespa bimaculata* Fourcroy, 1785, nor of Olivier, 1791.

Guérin gave the type locality as "Buru" (Boeroe), one of the Moluccas, and de Saussure's statement that the type, which he saw in Guérin's collection, came from Java, was due to an oversight. I have found no evidence as yet of the var. *alduini* or any of the forms of *V. affinis* occurring in Java. The var. *alduini* does not extend west of the Moluccas [7]).

Specimens Examined. — Boeroe, one female (Kuhn — U.S.N.M.). — Ceram: Jilo, two females (C. Ribble); Wahaai, several females (T. Barbour — M.C.Z.) — Ternate: (Par. M.). — Amboina: (Par. M.; Brux. M.). — New Guinea: Kaimana (Prince Leopold of Belgium — Brux. M.). — Bismarck or New Britain Archipelago: Ralum (Dahl — Berl. M.).

Additional Specimens. — Boeroe: long series (Denin — Buit. M.). — Amboina: one worker (Buit. M.). — Ceram: Watai, long series (Denin — Buit. M.). — Kei: one worker (H. C. Siebers — Buit. M.).

V. affinis var. *picea* R. du Buysson.

Vespa cincta var. *picea* R. du Buysson, 1905, Ann. Soc. Ent. France, LXXIII, (1904), pt. 3, pp. 488 and 537 (♀ New Guinea: Tupuseleia; Yule Island; Kapa-Kapa; type locality not designated). Cameron, 1911, Nova Guinea, IX, Zool., pt. 1, p. 186.

The var. *picea* is evidently the extreme melanic variation of *V. affinis*, being entirely black, except for a few ferruginous blotches on head and tegulae and a small, poorly defined ferruginous spot on each side near the base of the second tergite. The spots of the second tergite sometimes disappear entirely. There is, moreover, only a step from this to the var. *alduini* Guérin. That it is a color variation of *V. affinis* and not of *V. tropica* is clear from du Buysson's statement: "Le clypeus a les angles antérieurs arrondis," as well as from one of the cotypes which I saw at the Paris Museum.

Specimens Examined. — New Guinea: Tupuseleia, worker cotype (Par. M.); Bivak Island, four workers (Lorenz Exp. — Natura Artis Magistra Mus., Amsterdam); Noord Rivier, southern New Guinea, three workers (Lorenz Exp. — *Ibidem*); van Weelskamp, southern New Guinea, two workers (Lorenz Exp. — *Ibidem*).

This form is apparently peculiar to New Guinea.

[7]) Moreover, the Expedition of "La Coquille" did not visit Java.

VERZEICHNIS EINER SAMMLUNG *RUTELINAE* DES BUITENZORGER MUSEUMS (COL.).

Von

Dr. Fr. OHAUS
(Mainz).

I. Tribus Rutelini.

Peltonotus vittatus Arr. — M.O. Borneo Exped., Long Petak, Telen Fluss, 440 m. 15-21.X.1925 (H. J. Endert).

Herr Arrow beschrieb diese Art nach einem einzelnen Stück, die vorliegenden Stücke zeigen aber, dass die Art in der Färbung sehr variabel ist. Bei den hellsten Stücken ist der ganze Thorax einfarbig hell rotgelb ohne alle dunklere Zeichnung; dann treten 3 dunkle Längsstreifen auf und bei den dunkelsten Stücken ist der ganze Thorax schwarz bis auf zwei kleine gelbe Makeln an den Seiten. Die Deckflügel sind bei den hellsten Stücken rotgelb mit zwei undeutlichen schiefen Längsbinden; bei den dunkelsten Stücken werden sie schwarz mit 2 undeutlichen schmalen gelben Streifen. Kopf, Schildchen, Afterdecke, Unterseite und Beine sind immer schwarz, Propygidium und Pygidium stets glänzend mit leichtem irisirendem Schimmer. Die Oberlippe ist leicht eingeschnitten, die Beule am Seitenrand der Deckflügel beim ♀ sehr deutlich.

Ich vermute, dass *P. brunnipennis* Bend. nur eine Farbenvarietät dieser Art ist.

Parastasia bimaculata Guér. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen); S. Sumatra, Palembang, Soebangdjerigi, 15.VI.1933 (Soekarno).

Parastasia confluens Westw. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen).

Parastasia femorata Burm. — W. Java, Djampang Tengah, G. Tjisoeroe, 6 - 800 m, IX.1933 (M. E. Walsh).

II. Tribus Anomalini.

Anomala Sam. (subgen. **Aprosterna** Hope).

Aprosterna antiqua Gyll. — I. Soemba, Waingapoe, III.1925 (K. W. Dammerman).

Aprosterna breviceps Sharp. — W. Sumatra, Loeboeksikaping, 450 m, 1923-27 (L. Hundeshagen). M.O. Borneo Exped., Long Petak, Telen Fluss, 440 m, IX-X.1925 (H. C. Siebers).

Aprosterna pallida F. — W. Java, Soekaboemi, 650 m, XII.1932 (M. E. WALSH), Selabintanah, 1200 m, X.1933 (M. E. WALSH), G. Pantjar, 500 m, 11 - 14.XII.1931 (M. A. LIEFTINCK).

Aprosterna sternitica, n. sp. — I. Flores (West), Wai Sano, 700 m, XI.1929 (J. K. DE JONG).

Anomala SAM. (subgen. **Anomala** sens. str.).

Anomala brachycaula OHS. subsp. sangirana OHS. — Talaud Inseln, Karakelang, Beo, 1926 (ERIE).

Anomala chalcescens SHARP. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Anomala cuprascens WIED. — W. Java, Buitenzorg, 250 m, 18.XII.1929, 1 ♂ am Licht (M. A. LIEFTINCK), 16.VII.1922, 1 ♀; Djampang Tengah, G. Tjisoeroe, 6 - 800 m, II.1935 und Selabintanah, 1200 m, X.1933 (M. E. WALSH); G. Tangkoeban Prahoe, 1200 m, V.1934 (F. C. DRESCHER); Soemedang, III.1930 (J. K. DE JONG).

Anomala cuprascens var. *aurichalcea* BURM. — W. Java, Priangan, G. Tangkoeban Prahoe, 1200 m, IV.1934 (F. C. DRESCHER).

Anomala cypriochalcea OHS. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Anomala dorsosignata OHS. — N. Neu Guinea, Mamberamo, Hoofdbivak, 250 m, IX.1926 (W. M. DOCTERS VAN LEEUWEN).

Anomala fuscula SHARP. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Anomala inepta OHS. — N.O. Sumatra, Deli, Siriaria, 2.VIII.1928 (J. C. VAN DER MEER MOHR).

Anomala inguinalis OHS. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Anomala kinabaluensis OHS. — M.O. Borneo Exped., Long Petak, Telen Fluss, 450 m, IX-X.1925 (H. C. SIEBERS).

Anomala novoguineensis OHS. — N. Neu Guinea, Mamberamo, Rouffaer Rivier, 175 m, VIII.1926 (W. M. DOCTERS VAN LEEUWEN).

Anomala nycterina n. sp. — N. Neu Guinea, van Rees Geb., 300 m; Mamberamo, Van Gelderen Rivier, V.1926; Meervlakte, Motorbivak, VIII.1926 (W. M. DOCTERS VAN LEEUWEN).

Anomala obsoleta BLANCH. — W. Java, Duizend Eilanden, Dapoer, 13.VII. 1930 (M. A. LIEFTINCK); M. Java, Karimoen Djawa Inseln, V.1926 und 22-30. XI.1930 (K. W. DAMMERMAN & M. A. LIEFTINCK). O. Bali, Karangasem, X. 1928 (P. F. FRANCK). N.W. Soemba, Laora, 100 m, IV.1925 und N.O. Soemba, Kambera, III.1925 (K. W. DAMMERMAN).

Anomala ovalis BURM. — W. Java, Priangan, G. Tangkoeban Prahoe, 1200 m, VIII.1934 (F. C. DRESCHER).

Anomala pagana BURM. — W. Java, Priangan, Garoet (Kamodjang), 1400 m, V.1929, und G. Tangkoeban Prahoe, 1200 m, VI.1934 (F. C. DRESCHER).

Anomala pleuritica Ohs. — Sangihe u. Talaud Inseln, Liroeng, Salibaboe Insel, 1926 (Erie).

Anomala pumilis Osh. — W. Borneo, Melawi, XI-XII.1924 (Blanchemanche).

Anomala rotundiceps Sharp. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen).

Anomala saetipes Ohs. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen).

Anomala saopyga Ohs. — O. Java, Idjen Plateau, Kendeng (A. Heyne).

Anomala stigmipennis Ohs. — S. Sumatra, Lampongs, G. Tanggamoes, 2100 m. 31.XII.1934 (L. J. Toxopeus).

Anomala teretina Ohs. — N. Borneo, Kinabalu, Mt. Puka, 4000 m, 14.XI. 1932 (Mrs. Clemens).

Anomala windrathi Nonfr. — M.O. Borneo Exped., Long Petak, Telen Fluss, 450 m, IX-X.1925 (H. C. Siebers).

Anomala Sam. (subgen. **Euchlora** McLeay).

Euchlora anoguttata Burm. — Sangihe u. Talaud Inseln, Lobo, K. Bahewa, Gol. Doeata (Erie), Baleo (H. J. Lam). Aroe Inseln, Dobo, VI.1933 (M. E. Walsh). Morotai Insel, Goegoeti (Erie). N. Neu Guinea, Mamberamo, Rouffaer Fluss, Motorbivak u. Albatrosbivak, 175 - 250 m, VII-IX.1926 (W. M. Docters van Leeuwen).

Euchlora bicolor F. — W. Java, Duizend Eilanden, Dapoer, 13.VII.1931 (M. A. Lieftinck).

Euchlora chalcites Sharp. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen); S.O. Sumatra, Djambi, VII-XI.1929 (C. H. ter Laag). W. Java, Buitenzorg, 250 m, IV.1928 und Tjibodas, 1400 m, XII.1927 (H. C. Siebers); G. Gedeh, Selabintanah, 1400 m, X.1933 (M. E. Walsh); Bandoeng, 750 m, 8.III.1924; O. Java, Idjen Plateau, 950 m, Blawan, VI.1924 (K. W. Dammerman).

Euchlora colobocaula Ohs. — N. Sumatra, Atjeh, Singkel (M. E. Walsh); W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen); S.O. Sumatra, Djambi, VII-XI.1929 (C. H. ter Laag) und Palembang, Soeban Djerigi, 15.VI.1933 (Soekarno).

Euchlora denticrus Ohs. — W. Borneo, Marbau Tjandong, 24.IV.1923.

Euchlora heterotricha Ohs. — N.O. Sumatra, Moearasipongi, 18.X.1925 (L. Fulmek), S.O. Sumatra, Djambi, Bangko, VII.1925 (O. Posthumus).

Euchlora lasiocnemis Ohs. — M.O. Borneo Exped., Long Hoet, Telen Fluss, 140 m, 4 - 23.VIII.1925 (H. C. Siebers).

Euchlora latefemorata Ohs. — W. Borneo, Melawi, XI-XII.1924 (Blanchemanche).

Euchlora psittacina Ohs. — N.O. Sumatra, Bandarbaroe, 7.X.1925 (L. Fulmek).

Euchlora sapada Ohs. — W. Borneo, Pontianak (L. Coomans de Ruiter).

Euchlora scheepmakeri LANSB. — O. Java, Diëng Plateau, 2000 m, VIII. 1934 (F. DUPONT).

Euchlora viridis F. — N. Sumatra, Atjeh, Singkel (M. E. WALSH); W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN). W. Java, Djampang Tengah, G. Tjisoeroe, 6 - 800 m, IX.1933 (M. E. WALSH). Soela Inseln.

Euchlora viridis var. *nigra* NONFR. — O. Java, Idjen Plateau, Blawan, 950 m, V.1924 (K. W. DAMMERMAN).

Anomala SAM. (subgen. **Spilota** BURM.).

Spilota aegra OHS. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN). W. Java, G. Tangboeban Prahoe, 1200 m, 3.V.1934 (F. C. DRESCHER).

Spilota burmeisteri LANSB. — W. Java, Telagawarna, Poentjak-pas, 1480 m, 4.V.1930 (M. A. LIEFTINCK).

Spilota irrorella SAP. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Spilota maculata GUERIN. — N.O. Sumatra, Pakanbaroe, 23.X.1925 (L. FULMEK & H. H. KARNY).

Spilota tigrina NONFR. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. HUNDESHAGEN).

Spilota trivittata PERTY. — W. Java, Telagawarna, Poentjak-pas, 1480 m, und Telagasaät, 1450 m, 10.XI.1929, 3.X.1930 u. 9.VIII.1931 (M. A. LIEFTINCK); G. Tangkoeban Prahoe, 1200 m, V.1934 (F. C. DRESCHER); G. Papandajan Z., VI.1931 (K. W. DAMMERMAN); G. Gedeh, Sindanglaja, 1200 m, 7.IX.1934 (J. VAN DER VECHT).

Pseudosinghala HELL.

Pseudosinghala vorstmanni HELL. — Sumatra, Padangsidempoean, Sipirok, 17.X.1925 (L. FULMEK & H. H. KARNY).

Mimela KIRBY.

Mimela blumei HOPE. — W. Java, G. Tangkoeban Prahoe, 1200 m, III-IV.1934 (F. C. DRESCHER); G. Papandajan, 1300 m, VI.1931 (K. W. DAMMERMAN).

Mimela chrysoprasa HOPE. — W. Borneo, Melawi, XI-XII.1924 (BLANCHEMANCHE).

Mimela debilis SHARP. — N.O. Sumatra, Asahan, Tangga, 700 m, 2.VIII. 1928 (J. C. VAN DER MEER MOHR). M.O. Borneo Exped., Long Petak, Telen Fluss, 450 m, 15 - 21.X.1925 (H. C. SIEBERS).

Mimela discoidea BURM. — N.O. Sumatra, Deli, Siriaria, 2.VIII.1928 (J. C. VAN DER MEER MOHR). W. Java, Djampang Tengah, G. Tjisoeroe, 700 m, II.1935 (M. E. WALSH); Soekanegara, 800 m, 23 - 28.XII.1931 (M. A. LIEFTINCK); G. Tangkoeban Prahoe, 1200 m, III-IV.1934 (F. C. DRESCHER).

Mimela discoidea subsp. *sumatrana* OHS. — Straat Malacca, P. Berhala, VIII.1926 (J. C. VAN DER MEER MOHR).

Mimela drescheri Ohs. — C. Java, Diëng Plateau, 2000 m, VIII.1934 (F. Dupont).

Mimela insularis Ohs. — M.O. Borneo Exped., Long Petak, 450 m, 15 - 21. X.1925 (H. C. Siebers). S.O. Sumatra, Djambi Exped., Selemoekoe, VIII.1925 (O. Posthumus).

Mimela maculicollis Ohs. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen).

Mimela prilca n. sp. — N. Borneo, Mt. Kinabalu, Penibukan, 4000 ft., III.1933 (J. Clemens); W. Borneo, Mt. Dulit, 4000 ft.; M.O. Borneo Exped., Long Petak, 1170 m, 15 - 21.X.1925 (Endert).

Popillia Serv.

Popillia biguttata Wied. — W. Java, Buitenzorg, 250 m, Tjiboerial, 20.X. 1929, Tjiomas, 400 m, G. Megamendoeng, 700 m, G. Salak, Goenoengboender, 800 m, 26.XII.1929 (M. A. Lieftinck); G. Papandajan, 1300 m, VI.1931 (K. W. Dammerman).

Popillia parvula var. *kinabalensis* Ohs. — M.O. Borneo Exped. Marah, 10 - 28.XI.1925 (H. C. Siebers).

Popillia sandyx Newm. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen); O. Sumatra, Bandarbaroe, 9.X.1925 (H. H. Karny).

Adoretus Lap. sens. str.

Adoretus kamberanus, n. sp. — N.O. Soemba, Kambera, III.1925 (K. W. Dammerman).

Adoretus Lap. (subgen. **Chaetadoretus** Ohs.).

Chaetadoretus borneensis Kraatz. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen).

Chaetadoretus marahnus, n. sp. — M.O. Borneo Exped., Marah, 10 - 28.XI. 1925 (H. C. Siebers).

Chaetadoretus sciurinus Burm. — W. Java, Palaboeanratoe, Tjisolok, 2.V. 1932 (M. A. Lieftinck); G. Tangkoeban Prahoe, 1200 m, III.1934 (F. C. Drescher).

Chaetadoretus trichostigma Ohs. — W. Java, Buitenzorg, 250 m, 22.IX. 1922. Sonst Borneo.

1 frisch entwickeltes ♂, vielleicht mit lebenden Pflanzen eingeschlept.

Adoretus Lap. (subgen. **Lepadoretus** Rttr.).

Lepadoretus compressus Web. — W. Sumatra, Loeboeksikaping, 450 m, 1923 - 27 (L. Hundeshagen); S.O. Sumatra, Palembang, Kloeang, 29.X.1933 (Soekarno), Djambi Exped., Merket, 17.VIII.1925 (O. Posthumus), Djambi, VII-XI.1929 (C. H. ter Laag); S. Sumatra, Manna (M. Knappert). M.O. Borneo Exped., Marah, 10 - 28.XI.1925 (H. C. Siebers).

Anomala (Aprosterna) sternitica, n. sp. (Fig. 1).

Gestreckt eiförmig, nach hinten nur leicht verbreitet, flach gewölbt, oben und unten hell scherbengelb, glänzend, mit schwarzbrauner Zeichnung auf Kopf,

Halsschild und Deckflügeln; der Seitenrand der Deckflügel, die Afterdecke, Bauchringe und Beine mit einzelnen abstehenden Borsten, die Brust mit anliegenden weichen Haaren dicht bekleidet. Kopfschild etwa um die Hälfte breiter als lang, die Seiten nahezu parallel, die Vorderecken beim ♀ etwas mehr gerundet als beim ♂, der Rand fein aufgebogen, die Fläche wie die flache Stirn dicht und fein runzelig punktirt, wenig glänzend, der Scheitel dicht einzeln punktirt; bei hellen Stücken ist der ganze Kopf einfarbig rötlichgelb, bei dunklen treten auf dem Scheitel 2 schwarze Fleckchen auf. Halsschild dicht und fein punktirt, auf der Scheibe mehr einzeln, an den Seiten zusammenfliessend, die Randfurche ringsum scharf ausgeprägt, die Färbung entweder rein rötlichgelb, oder mit einer schmalen dunklen Zeichnung wie ein latein. V, oder mit einer grösseren zackigen schwarzen Makel auf der Scheibe; der Hinterrand mit einem Saum kurzer gelber Härchen. Schildchen dicht einzeln punktirt, rötlichgelb dunkel gesäumt. Auf den Deckflügeln springen die Schultern kräftig, die Spitzenbuckel weniger vor, die primären Punktreihen sind nur zum Teil regelmässig gefurcht, auf der Scheibe und beim Spitzenbuckel sind sie mehr verloschen, die Punktreihen der prim. Punktreihen kräftig und bei dunklen Stücken im Grunde schwarzbraun gefärbt, die ganze Oberfläche mit sehr feinen Pünktchen überstreut; die Grundfarbe ist rötlichgelb, alle Ränder und je ein Fleck auf Schultern und Spitzenbuckeln schwarzbraun, doch kann sich die dunkle Färbung so ausbreiten, dass sie die helle Grundfarbe fast ganz verdrängt. Afterdecke matt, dicht zusammenfliessend punktirt und fein querrunzelig, mit langen abstehenden Borsten am Rand und beiden Vorderecken. Die Abdominalsternite sind glänzend mit quereingedrückten flachen Ringpunkten bedeckt und tragen nahe dem Hinterrand eine weitläufige Querreihe von Grübchen mit abstehenden Borsten; auf dem ersten und zweiten hinter den Hinterhüften sichtbaren Sternit stehen diese Borsten ganz dicht neben einander gereiht und zwischen den hellen auch vereinzelte dunkle Borsten. Beine kräftig; die Schenkel mit feinen langen Haaren und einer Querreihe abstehender Borsten parallel zum Hinterrand; an den Vorderschienen stehen die 3 Zähne in gleichem Abstand, die Mittel- und Hinterschienen haben je 2 schiefe Stachelkanten; die Tarsen sind an allen Füssen dunkelbraun, an den vorderen die innere Klaue gespalten und beim ♂ leicht verdickt, an den Mittelfüssen die äussere Klaue bei ♂ und ♀ fein gespalten. Fühlerkeule beim ♂ nur wenig länger als beim ♀. Die Form des Forceps zeigt Fig. 1.

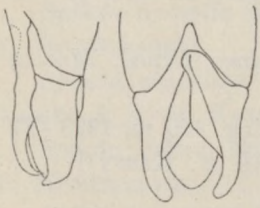


Fig. 1. — *Aprosterna sternitica*, n. sp.

L. 11 - 12, Br. 6 - 7 mm. ♂ ♀ — West-Flores: Wai Sano (Kratersee), XI. 1929 (J. K. DE JONG).

Anomala (sens. strict.) **nycterina,** n. sp. (Fig. 2).

Gestreckt oval, gut gewölbt, Oberseite und Schienen glänzend hell rotbraun, die Seiten der Deckflügel, Schenkel und Unterseite hell rötlichgelb, die Hintertarsen dunkelbraun; Oberseite kahl, die Brust dicht graugelb behaart, After-

decke, Abdominalsternite und Beine mit abstehenden gelben Borsten. Kopfschild gross, fast doppelt so breit als lang, die etwas nach aussen geschwungenen Seiten, der Vorderrand und die Stirnnaht hoch aufgebogen, fein schwarz gesäumt, die Fläche dicht runzelig; Stirn dicht und grob runzelig, der Scheitel einzeln punktirt. Die Augen sind sehr gross, vorgequollen, auch die Fühlerkeule beim ♂ gross, länger als die Geissel. Halsschild gut doppelt so breit als lang, gut gewölbt, die Randfurche auch vor dem Schildchen nicht unterbrochen, der Rand fein dunkelbraun, die Scheibe wie das Schildchen mit Andeutung einer mittleren Längsfurche, dicht und kräftig punktirt. Auf den Deckflügeln springen nur die Schultern, nicht die Spitzenbuckel etwas vor, die primären Punktreihen sind regelmässig gefurcht, im subsuturalen Interstitium stehen 2 secund. Rippen, die von der Basis bis zur Mitte durch eine unregelmässige Punktirung getrennt sind, im II. und III. je eine einfache seichte Punktreihe; an den Seiten sind die Punkte in den prim. Punktreihen stark quer eingedrückt und die Sculptur durch kurze feine Querrunzeln undeutlich. Afterdecke gut gewölbt, glänzend, mit in die Quere gezogenen meist einzelnen Ringpunkten; Abdominalsternite glänzend, mit einer Querreihe von Borstenpunkten, die auch in der Mitte nicht unterbrochen ist, und flachen Ringpunkten, die gelbe Härchen tragen, an den Seiten. Hinterhüften und Brust glänzend, dicht punktirt und graugelb behaart. Beine kräftig, an den Vorderschienen ist der Seitenzahn kräftig, der Spitzenzahn beim ♂ sehr lang, kaum nach aussen gebogen, die innere Klaue der Vorderfüsse etwas verdickt, gespalten. An den Mittelbeinen sind die Schenkel schmal, mit 3 Reihen von langen Borsten an Vorder- und Hinterrand sowie einer Grübchenreihe parallel zum Hinterrand; die Schienen sind vor der Spitze etwas eingeschnürt, mit einer starken schiefen Stachelkante in der Mitte, ihre Sporen schmal und spitz, die äussere Klaue ganz kurz eingeschnitten. An den Hinterbeinen sind die Schenkel stark verbreitert und haben nur parallel zum Vorder- und Hinterrand eine weitläufige Querreihe von Borstenpunkten; die Schienen sind verbreitert, mit 2 schiefen Stachelkanten; ihre Sporen sind kurz, verbreitert und zugerundet. Forceps Fig. 2. L. 10 - 11½, Br. 4½ - 5½ mm. ♂ — N. Neu Guinea, Van Rees-Gebirge, 300 m; Van Gelderen Rivier, V. 1926; Meervlakte (Mamberamo Fluss), Motorbivak, VIII. 1926 (W. M. Docters van Leeuwen).

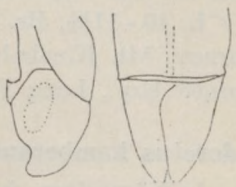


Fig. 2. — *Anomala nycterina*, n. sp.

Mimela prilca, n. sp.

Der *M. debilis* Sharp zunächst verwandt. Gestreckt oval, ziemlich gewölbt, hell scherbengelb mit leichtem grünem Erzschiller, lebhaft glänzend, oben kahl, Afterdecke, Bauch und Beine mit wenigen gelben Borsten, die Brust ziemlich dicht graugelb fein behaart. Kopfschild fast halbkreisförmig mit fein aufgebogenem braunem Rand, die Oberfläche wie die hoch hinaufreichende flache Stirn dicht zusammenfliessend punktirt, nur neben den Augen einige einzelne grobe Punkte; die scharf ausgeprägte Stirnnaht etwas nach hinten geschwungen.

Halsschild an den Seiten dicht und zusammenfliessend, auf der Scheibe wie das Schildchen einzeln punktirt, die basale Randfurche ganz fehlend. Auf den Deckflügeln sind die prim. Punktreihen fein aber regelmässig gefurcht, die Punkte derselben einzeln, kräftig, im subsuturalen Interstitium 2 secund. Rippen, die fast bis zum Hinterrand durch unregelmässige Punkte getrennt sind, im II. und III. Interstitium nur je 1 Punktreihe. Afterdecke glänzend, leicht gewölbt, mit in die Quere gezogenen groben Punkten und Querrunzeln, nur die Seiten und die Spitze mit einzelnen Borsten. Abdominalsternite mit groben, in die Quere gezogenen Ringpunkten, die in der Mitte einzeln stehen, an den Seiten zusammengedrängt. Hinterhüften und Brust mit grossen Ringpunkten, jeder mit einem feinen graugelben Härchen. Die Beine sind schlank aber kräftig, die hinteren Schienen etwas wadenartig verdickt. Forceps Fig. 3. — ♀. Die Färbung ist oben und unten gleichmässig hell scherbengelb mit grünem Erzschiller ohne alle dunkle Zeichnung; die Afterdecke ist länger, die Fühlerkeule kürzer, der Spitzenzahn der Vorderschienen breiter und stärker gerundet, als beim ♂.

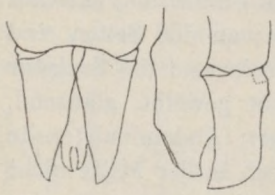


Fig. 3. — *Mimela prilca*, n. sp.

♂. Auf den Deckflügeln treten zusammenhängende wolkige Trübungen auf, zwischen denen die weissgelbe Grundfarbe scharf hervortritt; bei einigen Stücken zeigt der Scheitel, die Mitte des Halsschildes und die Partie hinter dem Schildchen dunkelbraune Flecken; auch ist das Kopfschild etwas kürzer als beim ♀.

L. 10 - 11½, Br. 5 - 6 mm. ♂ ♀. — W. Borneo: Mt. Dulit, 4000 ft. — N. Borneo: Mt. Kinabalu: Penibukan, 4000 ft., III. 1933 (J. CLEMENS) — M.O. Borneo Exp., Long Petak, 1170 m, 15 - 21. X. 1925 (H. J. ENDERT).

Adoretus kamberanus, n. sp. (Fig. 3).

In Körperform dem weit verbreiteten *A. versutus* HAR. und *concolor* BLANCH. ähnlich, etwas dunkler, oben und unten gleichmässig satt rotbraun mit hellbraunen Fühlern, gleichmässig kurz und anliegend hellgrau behaart. Kopfschild nahezu halbkreisförmig mit fein aufgebogenem Rand, beim ♂ etwas kürzer als beim ♀, die Oberlippe mit gekieltem Rostrum und gekerbten Seitenrändern; die Fühlerkeule auch beim ♂ kürzer als die Geissel. Seitenrand von Halsschild und Deckflügeln mit abstehenden kurzen Borsten, die Spitzenbuckel der Deckflügel etwas vorspringend und die Haare darauf etwas dichter zusammengedrängt, aber nicht länger. Auf der Afterdecke sind die Haare an den Seiten und auf der Spitze länger und stehen starr ab. Beine plump; an den Vorderschienen ist der mittlere Zahn dem Spitzenzahn etwas genähert, an den Mittelschienen stehen 2, an den hinteren Schienen nur 1 deutliche schiefe Stachelkante; die äussere Klaue der Mittel- und Hinterfüsse mit einem Zähnchen an der ventralen Kante. Forceps Fig. 4.

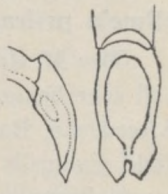


Fig. 4. — *Adoretus kamberanus*, n. sp.

L. 10½ - 11, Br. 5 - 5½ mm. ♂ ♀. — N.O. Soemba: Kambera, III. 1925 (K. W. DAMMERMAN).

Chaetadoretus marahnus, n. sp. (Fig. 4).

Nach Körperform und Färbung dem *Ch. palawanus* Ohs. zunächst verwandt. Gestreckt oval, ziemlich gewölbt, oben und unten gleichmässig hell rötlichbraun, beim ♂ die ganzen Beine, beim ♀ nur die Schenkel gelb, überall weitläufig und kurz grau behaart, auf den Deckflügeln mit Reihen aufrechter längerer Borsten und ausserdem auf dem Kopf, Halsschild und Afterdecke mit einzelnen längeren abstehenden Borstenhaaren zwischen den liegenden Härchen. Kopf sehr gross, Kopfschild beim ♂ mehr als doppelt so breit wie lang, flach parabolisch; beim ♀ länger, fast halbkreisförmig. Kopf, Halsschild und Schildchen mit grossen Ringpunkten bedeckt, die seitlich zusammenfliessen und deren etwas erhabene Ränder feine Querrunzeln bilden. Die Deckflügel sind dicht zusammenfliessend punktirt, die erste primäre Punktreihe neben der Naht ist tief gefürcht, die anderen nur auf kurze Strecken, die primären Rippen jedoch deutlich etwas mehr gewölbt als die Interstitien. Afterdecke beim ♂ länger und stärker gewölbt als beim ♀. Beine kräftig, die Schenkel schmäler als die Schienen, an den vorderen die 3 Zähne in gleichem Abstand, beim ♀ sehr kräftig, beim ♂ der basale Zahn fast verloschen; an den Mittel- und Hinterschienen nur je 1 kurze schiefe Stachelkante; die grössere Klaue an Vorder- und Mittelfüssen beim ♂ nicht verdickt, ganz kurz und fein eingeschnitten. Fühlerkeule beim ♂ verlängert; das Rostrum der Oberlippe gekielt.

L. 8½, Br. 4 - 4½ mm. ♂ ♀. — M.O. Borneo Exped., Marah, 10 - 28. XI. 1925 (H. C. Siebers).

EINE HYLOPHILIDEN-AUSBEUTE VON SUMATRA (COL.).

Von

Dr. RUDOLF F. HEBERDEY

(Graz).

Von Herrn Hofrat Dr. L. Fulmek in Wien erhielt ich eine Anzahl von Hylophiliden zur Bearbeitung, die von ihm auf Sumatra gesammelt wurden. Das gesamte Material befindet sich jetzt in meiner Sammlung, wofür ich auch an dieser Stelle meinen wärmsten Dank ausspreche.

Trotzdem von Sumatra bereits eine ziemliche Anzahl von Hylophiliden bekannt ist, haben sich doch in diesem Material vier neue Arten gefunden. Die Bearbeitung wurde sehr erschwert dadurch, dass die bisher bekannten Arten mit ganz wenigen Ausnahmen völlig unzureichend beschrieben sind. Es existieren im Wesentlichen nur einige von Pic verfasste, ganz kurz gehaltene Tabellen, die wohl gestatten mögen, an Hand der Typen die einzelnen Arten auseinanderzuhalten, die aber völlig unzureichend sind, um die Arten ohne Kenntnis der Typen wiederzuerkennen. Daher kommt es, dass bei jenen Tieren, in denen ich schon bekannte Arten wiederzuerkennen glaube, die Bestimmung stets eine zweifelhafte bleiben musste. Neu beschrieben werden im Folgenden nur solche Formen, die ich bei eingehendem Studium der Pic'schen Tabellen und der wenigen später erschienenen Einzelbeschreibungen, mit keiner der bereits beschriebenen Arten auch nur annähernd in Übereinstimmung zu bringen vermöchte.

Das Material enthält folgende Arten:

1. *Hylophilus trimaculatus* Pic (?) Sumatra-Ostküste, Maryland, V. 1925, 4 Stücke.
2. *Hylophilus subsericeus* Pic (?) Sumatra-Ostküste, Maryland, V. 1925, 2 Stücke.
3. *Hylophilus nov. spec.* ? Sumatra-Ostküste, Maryland, V. 1925, 1 Stück.

4. **Hylophilus barbatus** nov. spec.

Ziemlich matt; rotbraun, Flügeldecken in der Mitte mit schmaler, die Naht nicht erreichender, schwarzer Querbinde, Fühler und Beine rötlich gelbbraun; dicht, die Skulptur der Oberseite stark verdeckend, ziemlich lang, am Vorderkörper etwas abstehend und zottig, auf den Flügeldecken ziemlich anliegend, grau behaart; Vorderkörper (soweit erkennbar) dicht und fein, Flügeldecken kräftig, mässig dicht punktiert.

Kopf ziemlich gross, hinten gerade abgestutzt mit sehr grossen, den Hinterrand des Kopfes erreichenden Augen, diese vorne ausgerandet, in der

Ausrandung die Fühler wurzelnd, Stirn zwischen den Augen nicht ganz ⅓ der Kopfbreite betragend, merklich schmäler als zwischen den Fühlerwurzeln; Fühler kräftig und gedrungen, die Halsschildbasis kaum überragend, die beiden Wurzelglieder (1. und 2. Glied) etwas verdickt, etwas dicker als die folgenden, erstes Glied ziemlich lang, etwas gekrümmt, 2. Glied kurz, nicht halb so lang als das 1., wie die folgenden kugelig-zylindrisch, 3. Glied ein wenig länger als das 2. und 4., 4. bis 7. Glied etwas länger als breit, die vorletzten Glieder etwas verdickt, Endglied ziemlich gross und dick, etwas länger als die beiden vorhergehenden zusammen, zugespitzt.

Halsschild ein wenig schmäler als der Kopf, etwas breiter als lang, fast rechteckig, an den Seiten ganz schwach, fast geradlinig zur Basis verengt, die Ecken etwas abgerundet, auf der Scheibe ziemlich gleichmässig gewölbt, vor der Basis mit zwei flachen Eindellungen.

Flügeldecken ziemlich gestreckt, an den Seiten flach gerundet erweitert, hinter der Basis und innerhalb der Schultern leicht niedergedrückt, diese kräftig vortretend; Vorder- und Mittelbeine schlank, die hinteren kräftig, Mittel- und Hinterschienen leicht gekrümmt, an der Aussenseite mit einer Kante, 1. Glied der Hintertarsen etwas flachgedrückt und leicht gekrümmt.

Grösse: 2 mm.

Verbreitung: Zentral-Sumatra, Pangkalang, Kotabaroe, X. 1925, 1 Stück.

5. **Hylophilus rubrocinctus** nov. spec.

Vorderkörper matt, Flügeldecken wenig glänzend; schwarz, das basale Drittel der Flügeldecken, die Wurzel der Schenkel und die Tarsen rotbraun; dicht, greis, fast staubartig behaart, Flügeldecken ausserdem noch mit sehr kurzen, etwas aufgerichteten Härchen, Hinterrand des Kopfes in einem schmalen Streifen dicht und kurz, weiss behaart; Vorderkörper überaus dicht sculpturiert, aus feinsten, auch bei stärkster Vergrösserung kaum unterscheidbaren Pünktchen bestehend, Flügeldecken fein genetzt, dazwischen im vorderen Drittel mässig dicht, wenig kräftig punktiert, die Punkte etwas länglich, Punktur nach hinten zu sehr rasch feiner werdend und fast verschwindend.

Kopf ziemlich gross, hinter gerade abgestutzt, mit sehr grossen, nierenförmigen Augen, Schläfen dahinter überaus kurz, Stirn zwischen den Augen viel schmäler als ein Auge, etwas schmäler als der Raum zwischen den Fühlerwurzeln, diese in den Ausrandungen der Augen gelegen; Fühler lang und kräftig, die Mitte der Flügeldecken überragend, 1. Glied zylindrisch, leicht gekrümmt, etwas mehr als doppelt so lang als breit, 2. Glied halb so lang als das 1., 3. bis 10. Glied etwa gleich lang, so lang als das 1., nach innen leicht sägeförmig erweitert, Endglied etwas länger, zugespitzt.

Halsschild viel schmäler als der Kopf, etwas länger als breit, fast zylindrisch, an den Seiten in der Mitte leicht gerundet erweitert, davor schwach kragenförmig abgesetzt, die Erweiterung in der Mitte dadurch nach vorne etwas buckelartig vortretend, Scheibe gleichmässig gewölbt, Basis schwach doppelbuchtig.

Flügeldecken mässig gestreckt, an den Seiten leicht gerundet erweitert, Schultern kräftig vortretend, hinter der Basis deutlich, neben dem Schildchen und innerhalb der Schultern leicht niedergedrückt; Beine kräftig und ziemlich lang, 1. Glied der Mittel- und Hintertarsen etwas flachgedrückt, an der Wurzel leicht gekrümmt.

Grösse: 1,6 - 2 mm.

Verbreitung: Sumatra-Ostküste, Maryland, V. 1925, 3 Stücke.

6. **Hylophilus abnormipes** nov. spec.

Mässig glänzend; dunkel gelbbraun oder rotbraun, Fühler, Taster und Beine heller; ziemlich kräftig, mässig dicht punktiert; dicht, kurz, greis, anliegend behaart.

Kopf ziemlich gross, hinten breit quer abgestutzt, mit sehr grossen, den Hinterrand des Kopfes nahezu erreichenden Augen, Stirn zwischen ihnen so breit wie ein Auge, so breit wie zwischen den Fühlerwurzeln; Fühler ziemlich kurz und zart, den Hinterrand des Halsschildes kaum überragend, die beiden Basalglieder verdickt, das 1. fast doppelt so lang als breit, das 2. etwa kugelig, 3. und 4. Glied schlank und gestreckt, 5. Glied ein wenig dicker aber kaum kürzer als das 4., 6. bis 10. Glied kurz und gedrungen, bei gewisser Betrachtung etwas breiter als lang, 5. bis 10. Glied ausserdem am Innenrand an der Spitze scharf gezähnt, Endglied kurz und dick, stumpf zugespitzt.

Halsschild merklich breiter als lang, kaum schmäler als der Kopf, an den Seiten bis vor die Mitte fast parallelseitig, dann kräftig in Bogen gerundet verengt, der Vorderrand leicht kragenartig angesetzt, auf der Oberseite etwas unregelmässig gewölbt, vor der Basis mit deutlicherem, querem Eindruck, davor buckelig gewölbt.

Flügeldecken wenig gestreckt, ziemlich gewölbt, an den Seiten sehr flach gerundet erweitert, neben dem Schildchen, innerhalb der Schultern und hinter der Basis etwas niedergedrückt; Vorderbeine ziemlich zart, Vorderschienen gegen die Spitze etwas flachgedrückt, Mittel- und Hinterbeine kräftig, Mittelschenkel auf der Innenseite mit mächtigem, einen queren Wulst bildendem, zum Teil lang gelb behaartem Zahn, Mittelschienen stark gekrümmt, in der Mitte mit scharfeckigem Zahn, dahinter tief ausgerandet, Hinterschienen leicht gekrümmt.

Grösse: 1,2 - 1,4 mm.

Verbreitung: Sumatra-Ostküste, Maryland, V. 1925, 2 Stücke.

7. **Hylophilus fulmeki** nov. spec.

Glänzend; dunkel gelbbraun, Fühler und Beine heller; wenig dicht, ziemlich lang, schräg abstehend, blass gelbbraun behaart, ausserdem noch mit einzelnen längeren abstehenden Haaren; Oberseite sehr kräftig und ziemlich dicht, Kopf etwas feiner punktiert.

Kopf ziemlich gross, hinter gerade abgestutzt, mit sehr grossen, den Hinterrand des Kopfes fast erreichenden Augen, diese vorne ausgerandet, darin die Fühler wurzelnd, Schläfen überaus kurz, stumpfwinkelig vortretend, Stirn

zwischen den Augen fast nur halb so breit als zwischen den Fühlerwurzeln, kaum ¼ der Kopfbreite betragend; Fühler lang und sehr kräftig, die Mitte der Flügeldecken erreichend, das Basalglied etwas dicker als die folgenden, leicht gekrümmt, 2. Glied etwas kürzer als das 3., 3. bis 6. Glied ziemlich zylindrisch, etwa um die Hälfte länger als breit, 7. bis 10. an Länge ab- an Breite sehr schwach zunehmend, so dass das 10. etwas quer ist, Endglied länger als die zwei vorhergehenden zusammen, zugespitzt.

Halsschild kräftig, etwas breiter als lang, an der Basis am breitesten, hier kaum schmäler als der Kopf und etwas spitzwinkelig vortretend, an den Seiten bis vor die Mitte fast parallelseitig, dann zum Vorderrand in kräftigem Bogen gerundet verengt, auf der Scheibe ziemlich gleichmässig gewölbt.

Flügeldecken wenig gestreckt, an der Basis am breitesten, mit sehr kräftig vortretenden Schultern, an den Seiten bis zur Mitte etwa parallel, dann gerundet verengt, auf der Scheibe jederseits mit einem ziemlich kräftigen, schrägen Eindruck, der an der Basis innerhalb der Schultern beginnt und sich verflachend zum vorderen Drittel der Naht hinzieht, diese hinter dem Schildchen ebenfalls etwas niedergedrückt; Beine ziemlich lang, besonders die Hinterbeine auch sehr kräftig, erstes Glied der Hintertarsen leicht gekrümmt.

Grösse: 1,4 - 1,5 mm.

Verbreitung: Sumatra-Ostküste, Maryland, V. 1925, 2 Stücke.

SOME NEW OR RARE FISHES OF THE INDO-AUSTRALIAN ARCHIPELAGO V [1].

By

Dr. J. D. F. HARDENBERG

(Laboratorium voor het Onderzoek der Zee, Batavia).

Fam. **ARIIDAE.**

HEMIPIMELODUS BLEEKER.

Hemipimelodus aaldereni nov. spec.

B.4; D.I.7; A.20; P.1.11; V.6.

Elongate. Height under dorsal spine, about 4 in length. Head 3.5 in length. Dorsal profile almost straight from dorsal to tip of snout, which is rather pointed. Mouth inferior. Band of maxillary teeth wholly visible when jaws are closed. Mouth crescentic, almost 3 in head. The line connecting the middle of the eye with the tip of the snout runs through the anterior nostril. Headshields slightly rugose. Occipital process long, its sides slightly converging posteriorly, its breadth more than twice in its length, rounded posteriorly, touching the rather broad and crescentic basal bone of the dorsal spine. The narrow, hardly visible fontanel does not reach the occipital process. Humeral process triangular, pointed, flattened, about 2½ in pectoral spine. Eyes elliptic about 7 in head, lateral, with a conspicuous free orbital margin, somewhat more than twice in snout. Maxillary barbels reaching half way on the ventrals. Mandibulary barbels reaching to origin of pectorals, mental ones somewhat shorter. Dorsal originating nearer to the pectorals than to the ventrals. Its height equal to length of head from posterior nostril. Dorsal spine somewhat shorter, flattened, its anterior and posterior border entirely smooth. Base of adipose fin much shorter than that of dorsal, about 5 in its distance from the latter. Height of anal much less than postorbital part of head, its inferior border somewhat concave, its base equal to length of pectoral spine. Ventrals equal to postorbital part of head, just reaching anal. Pectorals equal to length of dorsal spine; the spine somewhat shorter, its frontborder slightly rugose, its hindborder slightly denticulated, especially near the top. Caudal strongly forked, lobes rather pointed. No axillary pore. Minute villiform teeth in one curved band in upper jaw. The two slightly separated bands in the lower jaws are somewhat narrower. 10 stiff and flattened gillrakers, considerably shorter than branchial filaments. Colour of formol specimen brownish-greyish above, lighter below. Fins all more or less darkish. Barbels blackish.

[1] Cf. Treubia, XIII, p. 411; XIV, p. 215; XIV, p. 287; 15, p. 131.

One specimen of a total length of 46 cm. Middle course of Digulriver, South New Guinea. Leg. Dr. G. VAN AALDEREN January 1935. Named in honour of the collector Dr. G. VAN AALDEREN.

ARIUS C.V.

Arius carinatus MAX WEBER.

B.5; D.1.7; A.15; P.1.10; V.6.

Elongate. Height before dorsal spine somewhat less than 5 in length, height under dorsal spine somewhat more than 5. Head 3⅔ in length. Dorsal profile descending from dorsal to tip of snout with a marked convexity at the nape. Headshields rugose. Occipital process scarcely more long than broad at its base, left and right part meeting in a blunt angle in the middle-line, not carinated. Posterior end of occipital process broadly truncated. Median fontanel tapers acutely posteriorly, it reaches to crown of head anteriorly. Humeral process granular, about ¾ of pectoral spine. Semicircular basal bone of dorsal granular. Eye elliptic, situated rather lateral with free orbital margin, 9½ in head, 3½ in snout and 3½ in interorbital space. Lips thick, especially the upper one. Cleft of mouth inferior, somewhat less than 3 in head. Maxillary barbels reaching a little beyond base of pectorals, mandibulary barbels reaching beyond gillmembranes, mental ones much shorter. All barbels somewhat flattened. Height of dorsal equal to head without snout, its origin midway between ventrals and pectorals. Dorsal spine strong, flattened, its hindborder rather smooth, its frontborder granulated. Adipose fin originates before anal, its length is much shorter than postorbital part of head, its base is much longer than base of dorsal and equals about 1½ times its distance from the dorsals. Height of anal shorter than postorbital part of head, its length about as long as length of adipose fin.

Ventrals a little shorter than postorbital part of head not reaching anal. Pectorals somewhat shorter than length of head behind nostrils. The spine somewhat shorter again, it is flattened, strongly serrated posteriorly and totally smooth anteriorly. Caudal deeply incised with acute lobes. Axillary pore present. Feeble pointed teeth in one band in upper jaw, about 4½ times as long as broad. Mandibulary bands much narrower, tapering laterally. Four small elliptic groups of teeth on the palate. The two inner groups quite apart from each other, the outer groups nearly touching the inner ones. The long axis of all patches diverging strongly in an outward and backward direction. A median longitudinal keel on the palate, 8 stiff gillrakers, 12 stiff and low processes along the hindborder of the gillarch. Brownish above, whitish below. All fins darkish, paired fins with a white border. One specimen of a totai length of 38 cm. January1935. Middle course of Digulriver. Leg. Dr. G. VAN AALDEREN.

Literature:

1. *Arius carinatus* M. WEBER. Nov. Guinea IX 1913, pag. 537.

2. *Arius carinatus* WEBER and DE BEAUFORT. Fishes of the Indo-Australian Archipelago II 1913, pag. 292.

Arius digulensis nov. spec.

B.4; D.1.7; A.5.18; P.1.10; V.7.

Elongate. Height below dorsal spine about 4 in length without caudal. Head ± 4, rather rounded, depressed in front. Headshields slightly rugose and granular, as is the case with the occipital process, which is about twice as long as broad; its borders converging backwards, touching the semicircular basal bone of the dorsal spine; at the top the occipital process is about half as broad as at its base. Humeral process triangular, half as long as pectoral. Dorsal profile sloping down in a rather straight line to the broad and rounded snout. Mouth inferior, part of the band of maxillary teeth is visible when closed. Gape of mouth about twice in head, somewhat longer than snout and eye. Eye with a free orbital margin, situated quite lateral, somewhat less than 8 in head, about 2½ in snout, 5½ in interorbital space. Postorbital part of head about half as long as total head.

Maxillary barbels reaching down to about halfway the pectorals. Mandibulary ones as long as postorbital part of head; mental ones much shorter. Height of dorsal as long as head behind nostrils, its spine slightly rugose anteriorly, minute rugosities posteriorly. Base of adipose fin shorter than base of dorsal, about 4 in its distance from the dorsal, situated above hinderhalf of anal. Anal concave, its longest rays about as long as postorbital part of head. Ventrals touching the anal, about as long as postorbital part of head, shorter than the pectorals. Pectoral spine somewhat longer than half of head, nearly smooth in front, finely denticulated behind. Caudal deeply forked, lobes pointed. Villiform teeth in the upper jaw in a broad band, visible when mouth is closed. The two mandibulary bands are not so broad. Four patches of teeth on the palate. The two median patches, more or less square, touching each other. The two outer patches which are more broad than long touch the inner ones. About 10 short and stiff gillrakers. Formol specimen brownish above, whitish below. All fins more or less brownish.

One specimen of a total length of 52 cm. Middle course of Digulriver, January 1935. Leg. Dr. G. VAN AALDEREN.

Arius nudidens MAX WEBER.

B.5; D.1.7; A.19; P.1.12; V.6.

Elongate. Height under dorsal spine 4, head almost 3 in length without caudal. Width of head about 1.5 in its length. Dorsal profile descends in a straight line from dorsal to the flat, broad and rounded snout. Snout almost 3 in head. Mouth inferior. Maxillary teeth almost wholly visible, when mouth is closed. Gape of mouth somewhat more than twice in head. Lips strongly thickened, especially at corner of mouth. Headshields very slightly corrugated. Occipital process about 1½ times as long as broad at its base, its sideborders slightly converging posteriorly. No keel. Occipital process touches the basal bone of the dorsal spine. Median fontanel small and shallow. Humeral process short and broad, not visible below the skin (it is only touch-

able). Eye with incomplete orbital ring, situated laterally on the flat upperside of the head, seeing upwards, 13½ in length of head, 5½ in interorbital space. Maxillary barbels extending halfway down to the pectorals, mandibulary ones surpassing pectorals and mental ones surpassing gillopening. All barbels ribbonshaped. Height of dorsal equal to head without snout. Its spine flattened, frontborder slightly dentated as in the case of its hindborder [1]). Base of adipose fin much longer than that of dorsal, somewhat less than twice in its distance from lastnamed. Anal with a slightly concave hindborder, its greatest height equal to length of pectorals which are somewhat shorter than pectoral spine (less than ½ head). Flattened pectoral spine smooth, anteriorly [2]) as well as posteriorly. Ventrals rounded, just reaching anal, its length less than ½ head. Caudal deeply forked. Axillary pore present. Villiform teeth in a broad rounded band in the upper jaw, in two separate narrower ones in the mandibles. On the palate the teeth in 4 patches, the two rounded median ones half their diameter apart, touching the much larger oval lateral ones, the long axes of which diverge posteriorly. 12 flattened stiff gillrakers. Bluish above, silvery below. Fins darkish, all with hyaline borders.

One specimen with a total length of 50 cm. Middle course of Digulriver, South New. Guinea. Leg. Dr. G. VAN AALDEREN. January 1935.

My specimen shows differences with the original description in the following points. 1 The humeral process is only touchable and not visible and has a smooth and not a rough surface; 2 The maxillary barbels reach to halfway the pectorals instead of to the base, the mandibulary barbels reach to beyond the pectorals instead of only about halfway and the mental ones surpass the gillopenings; 3 The ventrals reach the anal instead of not. 4 The margin of the fins is hyaline instead of blackish and the centre of the fins is darkish instead of hyaline (just the reverse therefore).

Literature:

1. *Arius nudidens* MAX WEBER, Nova Guinea IX 1913, p. 538.

2. *Arius nudidens* WEBER and DE BEAUFORT. Fishes of the Indo-Australian Archipelago II 1913, p. 294.

Fam. **SCOPELIDAE.**

MYCTOPHUM RAFINESQUE.

Myctophum spinosum (STEINDACHNER).

B.8; D.14; A.16; P.14; V.8; L.l.40; L.tr.9.

Height 4.7, head 4 in length without tail. Eye 3 in head. Snout very short. End of upper jaw somewhat dilated posteriorly, reaching to beyond posterior border of eye. Origin of dorsal much before the middle, somewhat behind origin

[1]) In WEBER and DE BEAUFORT Vol. II p. 294 it is said that the front- and hindborder of the dorsal spine are serrated. In the figure however front- and hindborder are smooth!

[2]) WEBER and DE BEAUFORT say that the hindborder is serrated, though in the figure it is smooth.

of ventrals, ending slightly before origin of anal. Adipose fin above end of anal. Insertion of pectorals somewhat below the middle of the height of the body, reaching nearly as far as ventrals. Caudal forked. Scales large, ctenoid with many fine teeth. Luminous organs situated as follows. A small dorsal and ventral organ at frontborder of orbit. Two on the operculum, the larger dorsal one below level of frontmargin of eye, the smaller ventral one just below it on the level of the posterior end of the jaw. Three on the branchiostegals, 5 maculae pectorales (P.O.) [1]) between isthmus and ventrals, the two anterior ones are one scale apart from each other and from the third and the fourth below two consecutive scutes, the fifth placed in a somewhat higher level than the four foregoing ones, just before the ventrals. Two maculae subpectorales (P.V.O.). the upper one quite near the insertion of the pectoral fin, the lower (which is the most anterior of the two) about one scale lower, just behind the pectoral girdle, above the second P.O. One macula suprapectoralis (p.l.O.) above the upper end of the shoulder-girdle. Four maculae ventrales (V.O.), about equidistant from each other between the ventrals. 14 maculae anales (A.O.) in two groups, the seven anterior ones above the anterior two thirds of the anal; of the second group of seven only the three anterior ones are above the posterior end of the anal. Two maculae praecaudales (Pr. C.) arranged a little obliquely, far distant from the A.O. One macula supraventralis (V.L.O.) nearer to the lateral line than to the ventral fin. Three maculae supraanales (S.A.O.) in an oblique line. The anterior lowermost one scale above the fourth V.O., the middle and the uppermost one each one scale above and behind the foregoing. Macula postlateralis (Pol.) just below the lateral line, above the seventh A.O. Colour bluishsilverish when alive.

Description made after a specimen of 55 mm from Strait Sunda, caught above a depth of 750 m, south of the island of Krakatau. Caught at dark near the surface in a planctonnet.

Literature:

1. *Dasyscopelus spinosus* GILBERT. Mem. Mus. Comp. Zool. Harvard Coll. XXVI, 1918, p. 220.

2. *Myctophum spinosus* MAX WEBER, Siboga-Exp. Fishes, 1913, p. 87.

3. *Myctophum spinosus* WEBER and DE BEAUFORT. Fishes of the Indo-Australian Archipelago II, p. 164, 1913.

Fam. **POLYNEMIDAE.**

POLYNEMUS L.

Polynemus hexanemus C.V.

B.7; D^1.VIII; D^2.I.11; P.15 + 6; V.I.5; L.l.47; L.v.5-1-9.

Height 3.2, head 3.3, in length without caudal. Eyes 4.7 in head, about 3 in postorbital part, 1¼ in interorbital space. Snout about as long as eye,

[1]) Abbreviations according to the terminology of BRAUER.

prominent. Mouth large, reaching far behind eye. Maxillaries strongly dilated behind, scaly, twice in head. Head covered with scales to end of snout. Anterior and posterior nostril close together, close to frontborder of eye. Praeoperculum with a serrated hindborder, with one broader spine just above the lower angle which is produced and rounded. A short spine in the beginning of the lateral line. Upper lip hardly visible, lower lip well developed but not continuous at symphysis. A narrow villiform band of teeth in each jaw. A broad band on the palatines and a narrow small band on the vomer. Origin of first dorsal between that of pectorals and ventrals. First dorsal spine of first dorsal minute, second one the strongest, but shorter than third one, which is as long as head without snout. Origin of second dorsal in advance of that of anal, its spine strong, about ⅔ of second spine of first dorsal, longer than third anal spine. First and second spine small. Dorsals, anal and caudal scaly. Caudal deeply forked, the lobes pointed. Pectorals somewhat curved, all rays simple, longer than head. Pectoral filaments long, the longest surpassing anal. Ventrals somewhat shorter than postorbital part of head. Distance between origin of anal and origin of ventrals about as long as head without snout. Scales finely striated and serrated along their hindborder. Colour golden-yellowish, darkish above. Fins yellowish with more or less scattered black points.

One specimen of a total length 123 mm, Labuan (Strait Sunda) 30 Sept. 1931.

Literature:

1. *Polynemus hexanemus* CUVIER and VALENCIENNES, Hist. Nat. Poissons III 1829 p. 389.

2. *Polynemus hexanemus* BLEEKER, Verh. Bat. Gen. XXII. Bijdr. Percoid. 1849, p. 59.

3. *Polynemus hexanemus* GÜNTHER, Cat. Brit. Mus. II 1860, p. 325.

4. *Polynemus hexanemus* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago IV, 1932, p. 207.

Fam. **SCIAENIDAE.**

JOHNIUS BLOCH.

Johnius hypostomus (BLEEKER).

B.4; D.XI.31; A.II.8; P.1.18; V.I.6; L.l.53.

Height 3.5, head 3.6 in length. Eye 5 in head, about as long as rounded snout, about once in interorbital part. Maxillary reaches to below middle of eye. Teeth villiform, outer row enlarged. Border of praeoperculum slightly denticulated. Second dorsal spine longest, as long as postorbital part of head and half eye. Height of soft dorsal shorter than postorbital part of head. Second anal spine rather strong, longer than half the length of the soft rays, which are about as long as postorbital part of head and half eye. Ventrals as long as soft anal rays, only the first ray which is somewhat prolonged is longer.

Pectorals as long as ventrals. A black spot on the inner side of the operculum, shining through. Body and fins dusted with small black points, especially the spinous dorsal and the tip of the ventrals.

One specimen of a total length of 132 mm, 13-11-'33. Pantai Tjermin, East Coast of Sumatra (Strait Malacca). Leg. Mr. J. C. VAN DER MEER MOHR.

Literature:

1. *Corvina hypostoma* BLEEKER, Natuurkundig Tijdschr. Ned. Indië, Vol. 5, p. 499, 1853.
2. *Sciaena hypostoma* GÜNTHER, Catalogue of Fishes, Vol. 2, p. 293, 1860.
3. *Johnius hypostoma* BLEEKER, Verh. Kon. Akad. Wetenschappen Vol. 14, p. 42, 1874.
4. *Johnius hypostomus* FOWLER. United States National Museum, Bulletin No. 100, Vol. 13 p. 297, 1933.

Fam. **CARANGIDAE.**

CARANX (LAC.).

Caranx (Carangoides) chrysophrys C.V.

D^1.VIII (the anterior one procumbent); D^2.I.20; A.II.16; P.20; V.5.

Compressed, dorsal profile regularly convex. Ventral profile declivous (straight) to anal. Height about 2.5 in length without caudal, head 3 in length, about as long as high. Eye 4 in head, about 1.5 in postorbital part, situated above the longitudinal axis of the body. Eye diameter less than trenchant interorbital space. Cleft of mouth conspicuously below level of eye, it is oblique in a downward direction. Adipose eyelids small. Minute teeth in broad bands on jaws. Palatines toothed, a triangular patch on vomer. Also existant on tongue. Cheeks, upper part of operculum and temporal region scaled. Body covered with small scales. An area on breast, surpassing base of pectorals and base of ventrals naked. Anterior part of lateral line curved, parallel to dorsal profile, becoming straight below 14th soft dorsal ray. Curved portion much longer than straight part, which has 24 feebly developed keeled scutes. Only the most posterior are conspicuously armed. 16 rather long and slender gillrakers on the lower part of anterior arch. Spinous dorsal small, its largest ray much longer than eye. Anterior rays of soft dorsal forming a falcate lobe, as is the case with anterior rays of the anal. Caudal deeply forked. Pectorals falcate, longer than head, ventrals about as long as postorbital part of head. Colour silvery, darker above.

1 specimen with a total length of 265 mm Sangkapoera (Bawean) 19-4-1928.

Literature:

1. *Caranx chrysophrys* CUVIER and VALENCIENNES. Hist. Nat. Poiss. IX, 1833, p. 17.
2. *Carangoides chrysophryoides* BLEEKER, Nat. Tijdschr. Ned. Indië. I. 1851, p. 366.

3. *Caranx chrysophryoides* GÜNTHER, Cat. Brit. Mus. II, 1860, p. 452.

4. *Caranx nigrescens* DAY, Fishes of India, 1878-88, p. 223.

5. *Caranx chrysophrys* SAUVAGE, Poiss. Madagascar 1891, p. 328.

6. *Caranx (Citula) chrysophrys* WAKIYA, Ann. Carnegie Mus. XV, 1924, p. 180.

7. *Caranx chrysophrys* BARNARD, Ann. S. Afric. Mus. XXI 1925-1927, p. 540.

8. *Caranx (Carangoides) chrysophrys* WEBER and DE BEAUFORT, Fishes of the Indo-Australian Archipelago VI 1931, p. 239.

Caranx (Carangoides) compressus DAY.

D^1.VIII; D^2.I.23; A.II,I,20; P.I.19; V.5.

Oblong, elongate, compressed. Nape somewhat elevated and carinated. Height 3 in length without caudal. Dorsal and ventral profile nearly evenly convex. Head about 3.3 in length, about as long as high. Rostro-frontal line ascending in a slightly convex line. Eye about 3.5 in head, somewhat less than once in pointed snout. Small circular adipose eyelid. Maxillary extending beyond frontborder of eye. Mouth oblique, lower jaw strongly projecting. Teeth small in narrow bands on jaws, also on palatines, vomer and tongue. Breast scaly. Suborbital, praeoperculum, operculum and region of head posterior of the eye also scaly. Anterior part of lateral line slightly arched, becoming straight below 14th ray of dorsal. Straight part about twice in arched part. About 13 - 15 keeled scutes on caudal peduncle. Third dorsal spine about 4 in height of body, somewhat lower than anterior elevated part of second dorsal. First rays of anal also somewhat higher than posterior rays. Each with a low scaly sheath. Pectorals falcate, about 2½ in length of head and body, about ¼ longer than head, ventrals about 2.5 - 3 in head. Caudal forked. Colour silvery above (specimens in formol). Hindborder of praeoperculum and of operculum blackish. A minute black spot on operculum. Two specimens with a total length of 290 and 340 mm.

Fishmarket Batavia 1934. Caught by Japanese fishermen in the Java-Sea. The exact locality is unknown.

Literature:

1. *Caranx ferdau* CUVIER and VALENCIENNES, Hist. Nat. Poiss. IX, 1833 p. 56 (nec. FORSKÅL).

2. *Caranx ferdau* GÜNTHER, Cat. Brit. Mus. II 1860, p. 439 (nec. FORSK.).

3. *Caranx compressus* DAY, Fish. India 1878 - 1888, p. 221.

4. *Caranx (Carangoides) compressus* KLUNZINGER, Fische Roth. Meer. 1884, p. 98.

5. *Caranx (Carangoides) ferdau* WAKIYA. Ann. Carnegie Museum XV, 1924, p. 165.

6. *Caranx (Carangoides) compressus* WEBER and DE BEAUFORT. Fishes of the Indo Australian Archipelago VI, 1931, p. 223.

Caranx (Uraspis) helvolus (FORST MS.) (BL. SCHN.).

D^1.V; D^2.I.27; A.I.21; P.I.22; V.5.

Oval, compressed, body. Height about 2.5 in length without caudal, head somewhat less than 3. Eye large, about 3 in head, about 1⅓ in postorbital part. Eyelids developed. Maxillary reaching to frontborder of pupil. Single series of small, somewhat curved teeth in each jaw, none on tongue, palatines and vomer. Tongue and palate covered by a white, thick, movable membrane. Body, temporal region of head, upper part of operculum and part of the suborbital covered with small scales. A naked area on breast, surpassing base of pectorals and of ventrals. Anterior part of lateral line slightly and somewhat irregularly arched, becoming straight below middle of soft dorsal. About 34, low keeled, feebly developed shields. Spinous dorsal short and much lower than soft dorsal. Falcate lobe soft dorsal and anal only slightly developed, about as high as 1½ times the diameter of the eye. Pectorals falcate, long, somewhat longer than head. Length of ventrals about 1½ times the diameter of the eye. No free anal spines visible. Caudal forked. Colour of formol specimens dark above, lighter below. Vertical fins darkish, especially the dorsal and the margin of the caudal. Paired fins hyaline. Black spot in axilla of the pectorals. Upper part of head dark. Lips black in strong contrast with the white tongue and palate. Tongue and palate posteriorly also black.

Two specimens of a total length of 240 and 270 mm from the fishmarket of Batavia. Exact locality unknown, but certainly from the western part of the Java-sea. Hitherto not found in the Indo-Australian Archipelago. My specimens agree quite well with the description given by RÜPPELL of a specimen from the Red Sea under the name of *Caranx micropterus,* only the eye is much larger, going 3 instead of 4.5 in head. I do not think this difference sufficient to establish a new species on my specimens.

Literature:

1. *Scomber helvolus* BLOCH SCHNEIDER. Descr. Anim. 1801, p. 35.
2. *Caranx helvolus* CUVIER Vol. IX, p. 104.
3. *Caranx micropterus* RÜPPELL. New. Wirbelt. 1835. Fish. p. 46.
4. *Caranx helvolus* GÜNTHER II. 1860 p. 443.

Fam. **COTTIDAE.**

PLATYCEPHALUS BL. SCHN.

Platycephalus malayanus BLKR.

B.4; D^1.I,8; D^2.II,11; A.11; P.19; V.I.5; L.l. ± 55; L.v. 7 - 1 - ± 22.

Slender aplated body. Head lower than body, somewhat more than three in length without tail. Eyes directed upwards, oval. Its longest diameter about once in snout, about twice in postorbital part of head. Lower jaw longer than upper. Bands of villiform teeth in jaws. Villiform teeth on vomer and palatines. Tongue teethless, large. Seven spines on suborbital and subopercular ridge,

the fifth one the largest. Supraorbital ridge with three to four spines. Behind the middle of the eye is another ridge with 5 to 6 spines. This ridge is the continuation of the lateral line, the scales of which are not spined. Height of first dorsal about as long as postorbital part of head, third spine the longest. First spine short and thick. Length of the fin longer than postorbital part of head. Second dorsal about as high as first, second and third spines longest, the further ones gradually becoming shorter. Last rays somewhat prolonged. Length of second dorsal about as long as head. Height of anal about as long as snout and half eye. The anal fin is about as long as the dorsal. Length of pectoral fin, somewhat shorter than head without snout. Ventrals about as long as dorsal. Tail rounded. Colour brownish with streaks of darker spots on body and fins. Traces of dark bands on body. Narrow dark bands radiating from the eyes.

One specimen of a total length of 153 mm. South Coast of New Guinea 1932.

Literature:

1. *Platycephalus malayanus* BLEEKER. Nieuwe tientall. diagn. v. visschen van Sumatra. Nat. Tijdschr. v. Ned. Indië V.

2. *Platycephalus malayanus* GÜNTHER. Catalogue of Fishes II 1860, p. 184.

3. *Platycephalus malayanus* BLEEKER. Atlas Ichthyologigue Tab. CCCC XIX.

4. *Platycephalus malayanus* BLEEKER. Revision des espèces insulindiennes du Genre Platycephalus Versl. Kon. Acad. v. Wetenschappen 1878.

Fam. **MALACANTHIDAE.**

MALACANTHUS C.V.

Malacanthus latovittatus (LAC.).

D.47; A.38; P.16; V.5; L.l. ± 115; 9 rows of scales between linea lateralis and first rays of dorsal.

Long slender fish. Head about 3.5 in length without tail. Eye small, round, more than 7 in head, about 3 in postorbital part. Wholly developed eyelids. Nostrils small in front of the eye. The anterior one the smallest, about one diameter in front of the eye. Lips thick. Upper jaw somewhat longer than lower. Several rows of slender pointed teeth in each jaw. A big flat spine on the hindborder of the operculum. Height of dorsal twice as long as the eye. It is situated over almost the whole length of the body, beginning just behind the hindborder of the operculum. The length of the anal is equal to the distance from the origin of the anal fin to the corner of the mouth. Pectoral as long as head without snout. Insertion of ventrals below the insertion of the pectorals. Length of ventrals about $\frac{2}{3}$ of the length of the pectorals. Caudal slightly emarginated. Hindborder of scales ciliated. The scales become smaller towards the nape and are not imbricated there, as is the case on the belly. A naked spot just above the pectorals. Several rows of more or less irregularly placed,

not imbricated, scales behind and below the orbit and on the operculum. A broad dark band with rather irregular outlines from operculum to caudal. This band is continued on the caudal, where it has a bifurcation downwards, so that on the lower half of the caudal a whitish spot is included. This whitish spot reaches to the hindborder of the caudal. Upper part of caudal whitish. Abdomen whitish. Just above the longitudinal band on the body (which becomes fainter anteriorly) is an area which is whitish too and which gradually becomes darker towards the back. Head darkish. Lower half of dorsal blackish, upper part darkish (Description of the formol specimens!)

3 specimens of a total length of 35,37 and 41 cm, collected at different times at the fishmarket of Batavia. The specimens were caught in the western part of the Java-sea on coral reefs by Japanese fishermen. Exact locality unknown.

Literature:

1. *Malacanthus latovittatus* BLEEKER. Verh. Bat. Genootschap XXII, 1849, For further references see WEBER and DE BEAUFORT. Fishes of the Indo-Australian Archipelago I (also under the name of *M. taeniatus*).

2. *Malacanthus latovittatus* GÜNTHER. Catalogue of fishes III, 1861, p. 360.

3. *Oceanops latovittatus* JORDAN and SEALE. Bull. Bureau of Fisheries XXV, 1905, p. 277.

4. *Malacanthus latovittatus* FOWLER, Fishes of Oceania (Memoirs of the B.P. Bishop Museum X, 1928, p. 236).

Fam. **LABRIDAE.**

LABROIDES BLEEKER.

Labroides bicolor FOWLER and BEAN.

D.IX,11; A.III.10; P.12; V.5; L.l.26; L.tr.4-1-10.

Body oblong, slender. Head 3 in length without caudal. Height 4 in length. Eye rounded, 6.5 in head, 3.5 in postorbital part, about twice apart. Suborbital region and operculum conspicuously scaled. Lips produced, upper lip slightly longer than lower, lower lip divided into two lobes. Two curved canines in upper jaw, two somewhat smaller ones in the lower one. The upper canines just fitting in the aperture between the two lower ones. Linea lateralis bent down abruptly behind last ray of dorsal. Length of dorsal somewhat more than twice in length of head and body. First dorsal spine small, the following becoming higher gradually. Last dorsal spine lower than first dorsal ray. Length of anal somewhat less than 4 in length of head and body. Pectoral as long as postorbital part of head and half eye. Ventrals situated just before pectorals, about ¾ of pectorals, outer ray somewhat produced. Caudal slightly rounded. Head and anterior part of body brownish with a greenish tinge in the head. Posterior end of body and caudal yellowish white with a blackish submarginal crescent on the caudal. The whitish part of the body does not extend to before the last

spine of the dorsal. Lower half of anal and dorsal dark brownish, upper half greenish or bluish in the anterior part and whitish in the posterior part. Paired fins darkish.

One specimen of a total length of 12 cm. Found in the catch of Japanese fishermen (consisting of coralfishes) at the fishmarket of Batavia in 1934. The exact locality where this fish was caught is unknown, but it is certainly in the western part of the Java-sea.

Literature:

1. *Labroides bicolor* FOWLER and BEAN. Bulletin No. 100 Vol. 7 of the United States National Museum p. 224, 1928.

Fam. **BLENNIIDAE.**

XIPHASIA SWAINSON.

Xiphasia lessoni (KAUP.).

D.110; C.10; A. ± 100; P.11; V.3; B.6.

Very elongate eellike fish with more or less compressed tail. Head and abdomen about twice as high as tail, which in its middle is somewhat higher than in its anterior part, gradually tapering posteriorly. Greatest height of head and trunk twice in length of trunk and about 1.5 in head, somewhat more than postorbital part of head. Eye large, about twice in postorbital part of head and one apart. Snout shorter than eye, rounded. Gape of mouth opposite to lower part of eye, descending obliquely backwards reaching to below anterior part of eye. Nostrils conspicuous. Posterior nostril on a level with the superior rim of the eye and above the anterior rim. Just behind the anterior nostril a small opening (pore?) is to be seen. A row of small conical somewhat curved teeth in each jaw. In upper jaw a pair of small canines. A pair of big ones in the lower jaw. Length of head and trunk about 6.5 in tail, 7.5 in total length. Gillopening small, just before the pectorals. Pectorals somewhat longer than postorbital part of head. Ventrals about as long as eye. Vertical fins all united, Dorsal beginning on the head, just between the eye. Greatest height about 26 in length without caudal fin. Greatest height of tail about 40 in its length. Height of head somewhat less than 1.5 in its length. Eye about 3½ in length of head. Head ± 16.5 in total length and about twice in trunk. Colour of formol specimen brownish. Vertical fins blackish. Minute black chromophores on head.

One specimen of a total length of 230 mm from the south coast of New Guinea 1932.

Literature:

1. *Nemophis lessoni* KAUP. Proceedings Zool. Soc. 1858 p. 168. (fig!).
2. *Xiphasia setifer* (?) FOWLER. Fishes of Oceania, Memoirs of the B.P. Bishop Museum, Vol. X 1928.

ON SOME EARTHWORMS FROM THE BUITENZORG MUSEUM.

By

G. E. GATES

(Judson College, Rangoon, Burma).

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Three species of earthworms are now known from the island of Krakatau; *Pheretima dammermani, P. indica* and *Dichogaster bolaui.* On the island of Sebesi there have been collected worms belonging at least to four, possibly five, species; *P. capensis, falcata, indica, posthuma* and *quadragenaria.* Unfortunately the taxonomic status and (or) the correct nomenclature of three of these is, at present, unknown. The pantropical *Pontoscolex corethrurus,* apparently, has not yet reached either Krakatau or Sebesi.

The writer is indebted to the Director of the Buitenzorg Museum for the privilege of examining the earthworms from his Museum.

Genus **Drawida** MICHAELSEN.

Drawida MICHAELSEN 1900, Das Tierreich, vol. 10, p. 114, (Genotype, *Moniligaster barwelli* BEDDARD 1886).

Drawida nepalensis MICHAELSEN.

Drawida nepalensis MICHAELSEN 1907, Mitt. Mus. Hamburg, vol. 24, p. 146. (Type locality, Gowchar, near Katmandu, Nepal. Types in the Indian Museum).
Drawida nepalensis MICHAELSEN 1924, Treubia, vol. 5, p. 387. (Buitenzorg).

Material examined. — One dissected specimen from which the internal organs had been partly removed, labelled, "*Drawida nepalensis* MICH. Buitenzorg, Java. VI.1922. Leg. KONINGSB.".

Each male porophore has a characteristic genital marking. Within the porophore is the characteristic, genital-marking gland.

The prostates are elongate and slenderly club-shaped. The central body is of approximately the same shape, almost rod-like.

Genus **Pheretima** KINBERG.

Pheretima KINBERG 1867, Ofv. Ak. Forh. vol. 23, p. 102. (Genotype, by subsequent designation-MICHAELSEN 1907, *P. montana* KINBERG 1867). [1])

Pheretima capensis (HORST).

* *Megascolex capensis* HORST 1883, Notes Leyden Mus. vol. 5, p. 195. (Type locality, Cape of Good Hope ? Type in the Leyden Museum ?).

Pheretima quadragenaria MICHAELSEN 1924 (part), Treubia, vol. 5, p. 391. Specimens with 16 - 20 spermathecal setae on viii).

Material examined. — Two partially clitellate, undissected specimens from a tube labelled, [2]), *"Pheretima variabilis* (E. PERR.). Sebesi, N. IV.1921. Leg. DAMMERMAN", and three partially clitellate or fully clitellate specimens from a tube [3]) labelled, *"Pheretima variabilis* (E. PERR.). Sebesi, Zuid. 27.IV.1921. Leg. DAMMERMAN".

External characteristics. — Length, 90 - 120 mm. Diameter, 4 mm.

The setae begin on ii on which segment there is a complete circle. The setal formulae are shown below.

viii.	xvii.	xviii.	xix.	iii.	viii.	xii.	xx.
18	13	7	13	33	43	48	52
20	12	6	12	37	45	50	48
19	12	8	12	39	47	50	52
16	12	10	13	42	45	54	56
18	13	2	12	38	45	50	49

The first dorsal pore is located as follows: 9/10 (1), 9/10 but with a pore-like marking on 8/9 (1), 10/11 (1), 10/11 but with pore-like markings on 8/9 - 9/10 (1), pore-like markings on 8/9 - 12/13, none definitely recognizable as functional pores (1).

The clitellum does not extend either to 13/14 or to 16/17; intersegmental furrows and dorsal pores lacking, no setae visible. On the two specimens from the first tube the clitellar glandularity is only faintly indicated, intersegmental furrows and dorsal pores present, setae present only ventrally, on all three clitellar segments of one worm, on xvi only on the other worm.

[1]) MICHAELSEN has lately (1934, p. 12) divested *P. montana* of its dignity as the type species of the genus *Pheretima* and redesignated as the genotype, *P. californica* KINBERG 1867, a procedure which is, of course, a violation of the International Code (Article 30, g.).

[2]) In addition to these two specimens, the tube contained three clitellate specimens of *P. indica*, 1 juvenile specimen of *Pheretima* and a posterior fragment of a *Pheretima*.

[3]) In addition to these three specimens, the tube contained two worms referred to hereinafter as *P. falcata* and *P. quadragenaria*.

The spermathecal apertures are very tiny, perhaps not quite minute slits, on 7/8 - 8/9.

The apertures of the male invaginations are crescentic, transversely placed, the concave side facing anteriorly, each aperture about two intersetal intervals wide.

Genital markings are lacking.

Internal anatomy. — Septum 8/9 is represented by a ventral rudiment only; 9/10 probably lacking; none of the septa thickly muscular.

The intestinal caeca are simple, extending through 3 - 4 segments, the margins constricted slightly by the septa through which the caeca pass.

The last pair of hearts is in xiii (5). All hearts of ix-xiii pass into the ventral vessel. The hearts of x are smaller than the hearts of xi.

The testis sacs are paired and fairly widely separated mesially. The testis sacs of x are ovoidal, erect, with the larger, bluntly rounded end ventrally and the more pointed end dorsally, reaching upwards nearly to the level of the dorsal face of the gut and partially imbedded in the mesial faces of the seminal vesicles of xi. The testis sacs of xi are crowded against the anterior face of 11/12 by the anterior testis sacs and may push septum 11/12 posteriorly so that the sacs appear to be partially or wholly within xii. The seminal vesicles are fairly large, in contact dorsally with the dorsal blood vessel. The anterior vesicles dislocate 10/11 (?) which is closely adherent to the vesicles, forward into contact with the posterior margin of the gizzard. The septum can be dissected off, without rupture, from the vesicles. In addition to the adherence of 10/11 to a considerable portion of the mesial and lateral faces of the vesicles, delicate strands of connective tissue pass from the vesicles to the gut, the anterior face of 11/12 and to the parietes. After cutting this tissue and pushing the vesicles in a lateral direction away from the gut, the testis sacs of x can be seen to be imbedded in the mesial faces of the vesicles. With some care it is possible to dissect off the vesicles from the testis sacs without opening the latter. The vesicles may be slightly adherent to the roofs of the testis sacs of xi but can be dissected off without opening these posterior sacs. It scarcely seems likely that the testis sacs of x are actually within the coelomic cavity of xi, in spite of the appearances, hence it would appear to be possible that septum 10/11 is reduced to the connective tissue strands passing from the vesicles to

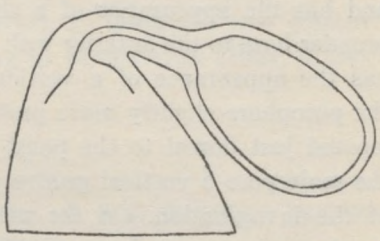


Fig. 1. *Pheretima capensis.* Ental end of spermathecal diverticulum, showing seminal chamber, neck and entalmost portion of the stalk, × *ca.* 95.

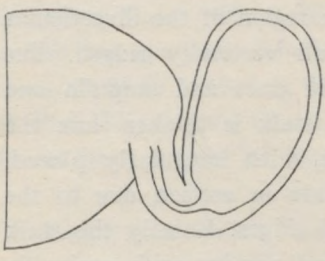


Fig. 2. *Pheretima capensis.* Ental end of another spermathecal diverticulum, × *ca.* 95.

the gut and parietes and that the septum immediately in front of the vesicles of xi is in reality 9/10. However, the hearts of x are actually on the anterior face of the first post-gizzard septum and though bound to that septum by connective tissue, can be dissected off without rupturing the septum. Some distance in front of the hearts of x is the single asymmetrical heart of ix which should be closer to the first post-gizzard septum if the latter is, in reality, 9/10.

In xiii there is a pair of small pseudovesicles and in xiv there is a pair of rudimentary pseudovesicles.

The prostates extend through xvi or xvii to xix, xx, or xxi and are, apparently, normal (not rudimentary) in all of the specimens. The prostatic duct is about 2 mm long, with muscular sheen, bent into a u-shaped loop, and passes, within the parietes, into the male invagination anterolaterally. The male invagination is hemi-spheroidal, the dorsal wall slightly protuberant into the coelom, at the level of the lining of the coelomic cavity, or within the parietes and covered over from view by nephridia. From the anterior wall of the invagination there protrudes into the lumen a rather indefinite porophore on the dorsal face of which, within a tiny transverse slit, is the minute male pore. In some of the specimens the male porophore is more conspicuously protuberant than others and has the appearance of a short, posteriorly directed cone, attached by its broader base to the anterior wall of the invagination. In one worm the porophore has the appearance of a vertically placed protuberance on the anterior wall, the porophore slightly more protuberant dorsally than ventrally, the male pore located just dorsal to the point of greatest protuberance. From slightly below the male pore a vertical groove passes on the porophore nearly to the aperture of the invagination. On the median wall of each of two invaginations there is what appears to be a disc-like marking with a translucent face, slightly protuberant, a structure which was not recognized in other chambers and may be merely fortuitous.

The spermathecal duct is narrowed within the parietes, rather spindle-shaped to bulbous within the coelom, the ampulla bound down slightly around the ectal end of the duct so that the latter has the appearance of being invaginated into the ampulla. The lumen is narrow, straight and with smooth wall in the parietal portion, abruptly widened in the region of the diverticular junction and in the coelomic portion with the wall vertically ridged. The diverticulum is longer than the combined lengths of duct and ampulla and is bent, on each spermatheca, into a c-shape. The stalk is thicker than the duct and with thick wall, with no muscular sheen, with irregularly placed, very slight, annular constrictions, with lumen stellate in section due to the presence of five to seven or more high, longitudinal ridges. Entally the stalk is connected to the seminal chamber by a short and slender neck region in which the lumen is very narrow and with smooth wall. The seminal chamber is ovoidal to nearly spheroidal, small, narrower than the stalk, the lumen large

and with smooth wall. There is no spermatozoal iridescence in the seminal chambers of worms from the first tube but the iridescence is present in the seminal chambers of worms from the second tube.

Remarks. — The specimens described above are referred to *P. capensis* simply because the spermathecal diverticulum appears to be more like that described by Horst than that figured by Perrier for *quadragenaria*. These two species, *capensis* and *quadragenaria*, have never been adequately defined and cannot, in spite of Michaelsen's efforts, be satisfactorily distinguished from each other. It will be necessary in the future, to indicate clearly the characteristics of specimens referred to any of these or related species until such time as the various forms can be adequately defined and correctly named.

In view of our present lack of knowledge of so many important characteristics of the different forms involved in the *capensis-quadragenaria* complex, it will be of little value to attempt a detailed consideration of the synonymies. It may be noted, however, that characteristics by which Michaelsen (1922, p. 55 - 57) distinguishes *P. capensis* from the related forms, are found in the present specimens which Michaelsen himself referred to *quadragenaria*. (*Vide* also remarks under *P. quadragenaria* hereinafter).

The specific label in the tube is quite incorrect. *P. variabilis* was erected by Horst in 1893, and not by Perrier. According to Michaelsen (1922, p. 59) *variabilis* is a synonym of *quadragenaria*.

Pheretima dammermani Michaelsen.

Pheretima dammermani Michaelsen 1924, Treubia, vol. 5, p. 391. (Type locality, Krakatau. Types in the Buitenzorg Museum).

Material examined. — Two clitellate, undissected specimens labelled, "*Pheretima dammermani* Mich. (Type!) Krakatau. IV.1920. Leg. Damm. No. 9.", two clitellate, undissected specimens labelled, "*Pheretima dammermani* Mich. (Type!) Krakatau, O. 25.IV.1919. Leg. Sunier. No. 4.", one partially clitellate, undissected specimen labelled, "*Pheretima dammermani* Mich. (Type!) Krakatau, O. ± 600 m 26.IV.1919. Leg. Dc. v. Lw. No. 5.", one clitellate, undissected specimen labelled, "*Pheretima dammermani* Mich. (Type!) Krakatau, O. 24.IV.1920. Leg. Damm. No. 8.", four macerated, aclitellate specimens labelled, "Krakatau, O. I.33. Leg. Damm.", eleven macerated, clitellate specimens from a tube labelled, "Krakatau, O. IV.34. Leg. Damm.".

External characteristics. — Length, 45 - 90 mm. Diameter, 3 - 4 mm.

The setae begin on ii on which segment there is a complete circle. The setal formulae are shown below.

vii.	viii.	xvii.	xviii.	xix.	iii.	viii.	xii.	xx.
18	18	12	6	11	36	46	48*	48*
18	16	12	8	12	39	48*	45*	52
17	19	11	6	12				
17	17	12	9	13				
17	17	11	7	12				
17	16	12	7	11				
17	19	14	8	14				

* Small gaps in the setal circles but in the gaps pits from which the setae have dropped or been pulled out.

The spermathecal pores are superficial, tiny, transverse slits, three pairs, on 6/7 - 8/9.

The male pores are minute and invaginate, each pore on a small, shortly conical body, protuberant into the lumen of a parietal invagination in a mesial direction from the lateral wall near the roof.

External genital markings are lacking.

Internal anatomy. — Septum 10/11 is membranous but, apparently, complete; 7/8 thin; 5/6 - 6/7 slightly thicker; 11/12 slightly thickened, more so than 12/13.

The intestine begins in xv. The intestinal caeca are simple, the margins slightly constricted by the septa through which the caeca pass.

The last pair of hearts is in xiii (5). All hearts of ix to xiii pass into the ventral vessel. The single heart of ix is on the right side (5).

The testis sacs are suboesophageal. In x there is usually a pair of testis sacs, separated from each other midventrally or in contact mesially but without communication. In one specimen in which the sacs are in apposition, an oval fenestra about as large as the testis is present in the midventral wall between the two sacs, the aperture with a smooth margin, the wall very slightly thickened around the margin of the aperture. In xi there is an unpaired testis sac (4) but in one specimen there is a pair of midventrally separated sacs each of which protrudes slightly in xii. The seminal vesicles are fairly large and in contact mesially above the dorsal blood vessel. The posterior vesicles push 12/13 back into contact with 13/14. The dorsal margins of the anterior vesicles are slightly incised by 10/11 which can be dissected off, with proper care, at least from the dorsal part of the vesicles. In two specimens septum 10/11 was successfully dissected off without rupture from the ventral portions of the vesicles. In this specimen at least, 10/11 is dislocated anteriorly into contact with the posterior margin of the gizzard by the vesicles of xi. Whether the failure to dissect off 10/11 from the ventral portions of the vesicles in other specimens is due to the poor preservation or to the penetration of 10/11 by the vesicles is not clear. A pair of small pseudovesicles in xiv, is present in two specimens, each pseudovesicle containing a brownish, granular material.

In xiii, in one specimen, there is a pair of smaller but whitish pseudovesicles. The prostatic duct is about 2 mm long, bent into a u-shaped loop, the ectal limb thicker than the ental limb. The duct passes into the lateral wall of the male invagination within the parietes. The roof of the invagination may be very slightly protuberant into the coelomic cavity but the lumen of the invagination is restricted to the parietes.

The spermathecal duct is shorter than the ampulla. The lumen is narrow and with smooth wall, slightly widened in the ectalmost portion and in the region of the diverticular junction. The diverticulum which is much longer than the combined lengths of duct and ampulla, passes into the coelomic portion of the duct just ectal to the ampulla. The diverticular stalk is longer than the seminal chamber and coiled in a regular, close helical (corkscrew) fashion. The wall of the stalk is thick, two distinct layers recognizable in cleared spermathecae, ridged internally, the ridges thick, longitudinal, 5 - 7 or more, the lumen stellate in section or the ridges may be less obvious or scarcely recognizable in which case the lumen is circular in section. The seminal chamber is shorter and thicker than the stalk and with thinner wall, looped irregularly or in part approximating to a regular zigzag arrangement, but not helically coiled like the stalk. Spermatozoa were found only within the seminal chamber.

Parasites. — Cysts are present and numerous within or on the nerve cord anteriorly.

Diagnosis. — Sexthecal, spermathecal pores superficial, very small, transversely slit-like, three pairs, on 6/7 - 8/9. Male pores minute and invaginate, each pore on a small, conical, mesially directed protuberance into the lumen of a parietal invagination from the lateral wall near the roof. Setae: VII/17-18, VIII/16-19, XVII/11-14, XVIII/6-9, XIX/11-14, 36-39/iii, 44-48/viii, 45-48/xii, 48-52/xx. First dorsal pore on 12/13. Length, 45-110 mm. Diameter, 3-5 mm. Segments, 83-90.

Intestinal caeca simple. Testis sacs ventral; of x paired, of xi unpaired. Spermathecal diverticulum passes into the ental portion of the duct just below the ampulla, diverticular stalk longer than combined lengths of duct and ampulla, helically coiled, seminal chamber shorter and slightly thicker, looped irregularly or in an approximation to zigzag.

Pheretima fakfakensis Cognetti.

Pheretima fakfakensis Cognetti 1908, Bull. Mus. Torino, vol. 23, No. 584, p. 1. (Type locality, Fak-Fak, Dutch New Guinea, Types, two aclitellate specimens, in the British Museum).

f. tetratheca Michaelsen.

Pheretima fakfakensis f. *tetratheca* Michaelsen 1910, Abh. Senck. Ges. vol. 33, p. 254. (Originals from Aru and Kei Islands. In the Senckenberg Museum?).

Material examined. — One clitellate, dissected and macerated specimen labelled *"Pheretima fakfakensis* Cogn. f. *tetratheca* MICH. Gn. Daab, Gr. Kei. 300 m IV.1922. Leg. H. C. SIEBERS.". Many of the internal organs had been removed.

External characteristics. — The pigmentation is a dark, purplish red, the unpigmented, setal bands clearly recognizable.

The setal formula is; vii/31, xvii/30, xviii/23, xix/32, 30/iii, 52/viii, 54/xii. The numbers are only approximate as setae have fallen out, to some extent at least, as a result of the maceration. Empty follicular pits were counted as setae. The segmental numbers were obtained by counting the setal follicles or follicular gaps in the musculature (but not the setae) visible on the coelomic face of the parietes.

The first dorsal pore is on 10/11 but is much smaller than the pore on 11/12.

The male pores are minute and superficial, each pore near the lateral margin of a translucent, nearly circular area. Each male pore area is on the concave median side of a thickly crescentic, whitish area with very sparsely distributed flecks of pigment.

The spermathecal pores are minute and superficial, transversely oval apertures, half way between the setae of their segments and the anterior intersegmental furrows, on vii and viii. Each pore is at the centre of a transversely oval, translucent area. Pigment is lacking on the presetal portions of vii and viii median to the lateral margins of the spermathecal pore areas though the postsetal portions of vii and viii are pigmented to a point median to the median margins of the spermathecal pore areas. There is a single female pore.

Genital markings are not recognizable.

Internal anatomy. — The spermathecal diverticulum is shorter than the combined lengths of duct and ampulla, passes into the duct ectally, at or within the parietes, and is slenderly club-shaped. The duct is narrowed within the parietes and entally has a wide lumen and rather thin wall. The spermatozoal mass appears to extend throughout the whole length of the diverticulum.

Remarks. — *P. fakfakensis* f. *tetratheca, P. invisa* COGNETTI 1913 and *P. kochii* COGNETTI 1913 (in part?) may all be synonyms of *P. annulata* (HORST) 1883. The description of the latter is very brief and, unfortunately, has never been amplified.

Pheretima falcata (HORST).

Perichaeta falcata HORST 1893, Notes Leyden Museum, vol. 15, p. 316. (Type locality, Sikka, East Flores. Types in Rijks Museum, Leiden).

Pheretima quadragenaria MICHAELSEN 1924 (part), Treubia, vol. 5, p. 391. (Specimens with more than 20 spermathecal setae on viii and with 18 male setae on xviii).

Material examined. — One clitellate, undissected specimen from a tube labelled, "*Pheretima variabilis* (E. PERR.) Sebesi, Zuid. 27.IV.1921. Leg. DAMM.".

External characteristics. — Length, 196 mm. Diameter, 7 mm.

The setae begin on ii on which segment there is a complete circle. The formula is; viii/23 + 3 (?), xvii/24, xviii/18, xix/23, 41/iii, 62/viii, 68/xii, 77/xx. Ventrally on segment viii there are three small gaps in the setal circle, each gap containing a pit from which the seta has been lost.

The first dorsal pore is on 12/13. There are no pore-like markings anterior to 12/13.

The clitellum is annular, not protuberant, extending from 13/14 nearly but not quite to 16/17; intersegmental furrows lacking, dorsal pores occluded but pit-like depressions still visible at the sites of the pores, no setae visible.

The spermathecal pores are small, transversely placed, crescentic slits, with the concave side of the slit facing anteriorly, two pairs, on 7/8 - 8/9.

The apertures of the copulatory chambers are transversely slit-like apertures with finely wrinkled margins.

Genital markings are lacking externally.

Internal anatomy. — Septum 8/9 is represented by a ventral rudiment only; 5/6 - 6/7 slightly muscular; 11/12 - 12/13 thickly muscular; 13/14 muscular; 7/8 membranous but slightly strengthened; 10/11 apparently absent or represented only by strands of connective tissue passing from the anterior seminal vesicles to the gut and the body wall; 9/10 probably present, rather membranous, displaced posteriorly.

The intestinal caeca are simple, the margins constricted slightly by the septa through which the caeca pass.

A pair of fairly large vessels pass from the dorsal trunk to the gizzard. Just in front of the first postgizzard septum is an unpaired heart, that of ix. On the posterior face of the first postgizzard septum but bound to the septum is a pair of hearts which must be the hearts of x. These hearts can be dissected off without rupturing the septum. Since these hearts are on the posterior face of the first postgizzard septum it appears to be necessary to regard this septum as 9/10 but displaced posteriorly. This septum is adherent to the anterior portion of the vesicles of xi. The last pair of hearts is in xiii. (Note. The relationship of the hearts of x to 9/10 is not quite normal as the hearts are usually some distance posterior to the anterior septum of their segment).

The testis sacs are paired. The sacs of x are ovoidal, vertically placed, with the larger, bluntly rounded end ventrally and the more pointed end reaching up nearly to the level of the dorsal face of the gut, located immediately behind the first post-gizzard septum, deeply indenting the mesial (that next to the gut) faces of the anterior seminal vesicles. The testis sacs of xi are smaller, suboesophageal, crowded by the anterior testis sacs against the anterior

face of 12/13. The vesicles are large and in contact mesially above the dorsal blood vessel. The anterior vesicles (covered by the first postgizzard septum) are in contact with the posterior margin of the gizzard. In xiii there is a pair of small pseudovesicles. In each of these vesicles there are small masses of brownish material similar in appearance to that of two, elongate, flat, thin, brown discs which were also found in xiii. In xiv there is a pair of rudimentary pseudovesicles. The prostates are small, almost restricted to xviii but reaching slightly into xvii and xix. The prostatic duct is about 2 mm long, bent into two shortly u-shaped quirks, and passes into the centre of the dorsal face of the copulatory chamber. The copulatory chamber is rather dome-shaped, elongately hemiovoidal, protuberant into the coelomic cavity to a height of 1½ mm. The male pore is a tiny, triradiate aperture at the ventral tip of a very shortly conical protuberance into the lumen from the roof near the posterior wall. In the anterior wall of the chamber is a vertically columnar body, circular in section, with a softish centre that appears to be glandular. The column is slightly protuberant into the lumen of the chamber and along the centre of this protuberant portion there is a narrow, band-like, vertically placed, translucent genital marking.

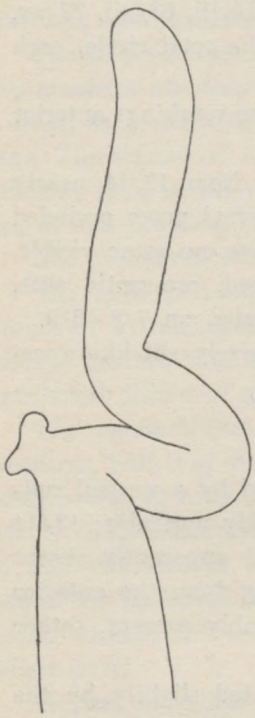


Fig. 3. *Pheretima falcata*. Spermathecal duct and diverticulum, × *ca.* 95.

The spermathecal duct is of about the same length as the ampulla, the latter bound down slightly around the ental end of the duct so that the duct has the appearance of being invaginated into the ampulla. The duct is gradually widened ectal to the diverticular junction and within the parietes. The lumen of the duct, ectal to the diverticular junction is transversely crescentic in section due to the projection into the lumen of a protuberance in the form of a half (vertical) column. The protuberance has a smooth, glistening appearance and terminates at one end just ectal to the diverticulum while at the other end it gradually diminishes in size in the parietal portion of the duct. Within the parietal portion of the duct the lumen gradually widens passing ectally. The diverticulum passes into the duct just ectal to the ampulla, opening into the duct lumen by a vertically slit-like aperture which can be revealed by carefully pulling the diverticulum off from the duct. The diverticulum is slightly longer than the combined lengths of duct and ampulla and is elongately sausage-shaped, with one or two bends. There is no definite external demarcation into stalk and seminal chamber. The wall is thickish and with a slight iridescence or sheen. Two diverticula were cleared and examined. One of these is bent twice, while the other is nearly straight. In the latter the sperm mass is elongate and with serrate margins. The lumen in the ectal portion of the diverticulum is empty, narrow and with

fairly smooth wall. In the other diverticulum, the lumen of the ental half (approximately only) is occupied by an elongate sperm mass with serrate margins as before but this mass is continuous through a narrow, short, rod-like portion with an almost ovoidal mass which occupies the lumen of the next quarter-length of the diverticulum. In this portion of the diverticulum the wall of the lumen is nearly smooth, the width of the lumen greater than the thickness of the wall. In the ectal quarter-length of the diverticulum the width of the lumen is less than the thickness of the wall. Although the inner face of the diverticular wall in this ectal portion at first appears to be fairly smooth, more careful examination shows what appear to be annular ridges. The sperm mass is not continued into the ectal quarter-length of the diverticulum.

Remarks. — *P. falcata* is known only from the types. HORST's description (1893) of course left much to be desired according to modern standards. MICHAELSEN later (1922, p. 57) examined two specimens from the Rijks Museum which are quite probably the types of *falcata* and filled in some of the gaps in the original description. MICHAELSEN agrees with HORST that septa 9/10 - 10/11 are lacking, points out that the copulatory chambers are "kreisrund" and notes that the Samen-raum of the spermathecal diverticulum is large, and "ganz einheitlich gestaltet", but fails to describe the interior of the copulatory chamber or to mention the stalk of the spermathecal diverticulum. The species cannot be adequately defined until we have further information with regard to the spermathecae, septa, and especially the copulatory chamber.

The Sebesi specimen described above appears to differ from *falcata* in the presence of 9/10, the reduction of 10/11, and the lack of an externally demarcated, diverticular stalk, but these differences can scarcely be regarded as sufficient justification for the erection of a new species at least at present.

P. floresiana MICHAELSEN 1934 cannot be satisfactorily distinguished from *P. falcata*. Both of these species are known (aside from the Sebesi specimen) only from Flores and from the types.

Pheretima indica (HORST).

Megascolex indicus HORST 1883 (part), Notes Leyden Mus. vol. 5, p. 186. (Types with copulatory chambers. Type locality unknown. Types in Leiden Museum?).
Pheretima quadragenaria MICHAELSEN 1924 (part) Treubia, vol. 5, p. 391. (Octothecal specimens only).

Material examined. — Three clitellate specimens from a tube labelled, "*Pheretima variabilis* (E. PERR.) Sebesi, N. IV.1921. Leg. DAMMERMAN.", three clitellate specimens labelled, "Krakatau, O. IV.34. Leg. DAMMERMAN.", and one clitellate specimen labelled, "Krakatau, IV.33. Leg. DAMMERMAN.".

The setal formula of one of the specimens is: vi/13, vii/12, viii/13, xvii/12, xviii/8, xix/12, 26/iii, 39/viii, 37/xii, 41/xx.

On each spermathecal diverticulum, in addition to the usual, terminal seminal chamber, there is an extra, lateral seminal chamber.

The specimens from the tube labelled *P. variabilis* are quite characteristic and normal in all respects. (*Vide* GATES 1935, p. 83 - 89).

Pheretima omtrekensis COGNETTI.

Pheretima omtrekensis COGNETTI 1911, Boll. Mus. Torino, vol. 26, No. 641, p. 3. (Type locality, Humboldt Bay, Dutch New Guinea. Type in the Amsterdam Museum).

Pheretima keiana MICHAELSEN 1924, Treubia, vol. 5, p. 394. (Type locality, Mount Daab, Groot Kei, Kei Islands. Types in the Buitenzorg Museum).

Material examined. — One specimen, opened by a ventral dissection, much macerated, possibly clitellate or partially clitellate, from a tube labelled, "*Pheretima fakfakensis* COGN. f. *tetratheca* MICH. Gn. Daab, Gr. Kei. 300 m IV.1922. H. C. SIEBERS.".

External characteristics. — There are 6 spermathecal setae on viii. On xviii between the male pores there are four tiny pits that look like unusually small, setal pits but even with high magnification (32 mm objective) and brilliant illumination, setae cannot be definitely identified.

The first dorsal pore is on 12/13.

A region extending from 13/14 to 16/17 is quite different in appearance from the neighbouring segments and on the clitellar segments setae are not visible.

The male pores are minute, transversely placed, oval apertures and are not located on porophores or special areas.

The spermathecal apertures are tiny, transversely placed, oval openings, two pairs, on 7/8 - 8/9. Just within each aperture there are visible two tiny tubercles, one lateral and one median which give to the duct lumen, just within the parietes, a longitudinally slit-like appearance.

The genital markings are small, very slightly protuberant, with deep, concave faces that give each marking a crater-like appearance. Within the concave portion 2 - 4 transversely placed rows of fine pores are recognizable, so that the marking has a sieve-like appearance. Just behind each spermathecal pore, except on the right side of 7/8, there is a transversely oval marking. Just in front of the right spermathecal pore on 7/8 there is a transversely placed, crescentic marking. On the postsetal portion of x there is another transversely oval marking. The number of pores on these markings appears to be about half or less that of the postclitellar markings. Some of the postclitellar markings cannot be accurately located as the intersegmental furrows are no longer visible. There is a pair of markings on or near to each of intersegmental furrows 17/18, 18/19, and 19/20, a marking on the right side, on or near to 20/21, and another asymmetrical marking on or near to 16/17. These markings are all slightly lateral to the male pore lines but are not in regular longitudinal rows. On xviii there is a further pair of markings, postsetal, each marking just median and very slightly posterior to a male pore. The postclitellar markings are slightly larger than the preclitellar.

Internal anatomy. — The intestinal caeca are simple, apparently with the margins slightly constricted by the septa.

The prostatic duct is 2 - 3 mm long, the main portion spindle-shaped, with muscular sheen, a very short, ental portion bent into a tiny u-shaped quirk.

The spermathecal duct is somewhat shorter than the ampulla and sharply demarcated therefrom. The diverticulum is about as long as the combined lengths of duct and ampulla, is slenderly club-shaped and passes into the ental portion of the duct just below the ampulla.

Remarks. — As a result of the maceration, important characteristics of internal structures, and in particular of the reproductive organs, cannot be ascertained. The specimen may possibly be one of the two types of *P. keiana,* at least the worm was collected at the same place, at the same time and by the same person as the types of *keiana.*

The specific name *omtrekensis* is, of course, etymologically absurd but certainly cannot be regarded as an error of transcription, a *lapsus calami,* or a typographical error (Article 19 of the code) as the word was deliberately formed from what appeared to the author to be the name of the locality from which the worm was secured. Since, "a specific name, once published, cannot be rejected, even by its author, because of inappropriateness" it is necessary to reject *homoeotrocha* which COGNETTI later (1914) substituted for *omtrekensis.*

Pheretima posthuma (L. VAILLANT).

Perichaeta posthuma L. VAILLANT 1868, Ann. sci. nat. Ser. 5, vol. 10, p. 228. (Type locality, Java? Types in the Paris Museum).

Pheretima posthuma MICHAELSEN 1924, Treubia, vol. 5, p. 394.

Material examined. — One clitellate, dissected specimen labelled, "*Pheretima posthuma* (VAILL.) Sebesi, N. IV.1921. Leg. DAMMERMAN.", and one clitellate, macerated specimen labelled, "*Pheretima posthuma* (VAILL.) Soemenap. 1906. Leg. v. KAMPEN.".

The first postgizzard septum in each of these specimens is 8/9 as in Burmese individuals of the species.

Pheretima quadragenaria (E. PERRIER).

Perichaeta quadragenaria E. PERRIER 1872, N. Arch. Mus. Paris, vol. 8, p. 122. Type locality unknown. Types, two, in the Paris Museum).

Pheretima quadragenaria MICHAELSEN 1924 (part), Treubia, vol 5, p. 391. (Specimens with few spermathecal setae on viii).

Material examined. — One clitellate, undissected specimen from a tube labelled, "*Pheretima variabilis* (E. PERR.). Sebesi, Zuid. 27.IV.1921. Leg. DAMMERMAN.".

External characteristics. — This worm is so similar to those referred on a preceding page to *P. capensis* that it will be sufficient to point out the differences only.

Length, 116 mm. Diameter, 5 mm.

The setal formula is: viii/4, xvii/19, xviii/10, xix/19, 41/iii, 37/viii, 67/xii, 69/xx. The low number of spermathecal setae as well as the low segmental number for viii is due to the presence of two wide gaps in the setal circle of the segment, extending from the spermathecal pore lines mesially. In removing the cuticle several setae were pulled out from the body wall and in making the counts on xii and xx, three or four pits on each segment from which setae appeared to have been just removed were numbered as setae.

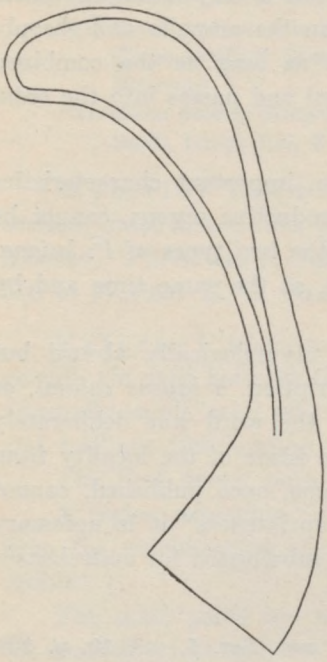


Fig. 4. *Pheretima quadragenaria*. Ental end of spermathecal diverticulum, showing seminal chamber, neck and entalmost portion of the stalk, × *ca.* 95.

The first dorsal pore is in 12/13. There are no pore-like markings anteriorly.

The clitellum terminates posteriorly in front of 16/17, extending perhaps over half or slightly more of xvi, but reaches anteriorly to 13/14.

The male pores are transversely slit-like, not crescentic, the margins finely wrinkled.

Internal anatomy. — Septa 11/12 and 12/13 are muscular and thicker than in the forms referred to *capensis*.

The testis sacs and seminal vesicles are as in *capensis* except that the testis sacs of x apparently do not indent the median faces of the anterior seminal vesicles. The prostates extend through xvii-xxi and appear to be normal, not rudimentary. The prostatic duct has a muscular sheen, is erect, rather spindle-shaped and passes into the copulatory chamber laterally, at or within the parietes. The copulatory chambers are rather dome-shaped, circular in section, protuberant into the coelomic cavity to a height of 1½ mm, the wall thick and with muscular sheen. From the wall of the chamber there project conspicuously into the lumen five protuberances with smooth, glistening surfaces. One of these protuberances, from the lateral wall but rather anteriorly, bears on its dorsal face a transverse slit within which is the male pore.

The spermathecal diverticulum is longer than in *capensis* and is not c-shaped but somewhat spirally or irregularly twisted. The seminal chamber is rather pear-shaped and externally is not demarcated from the neck as clearly as in *capensis*. The sperm mass is also pear-shaped and extends down into the narrow, neck region.

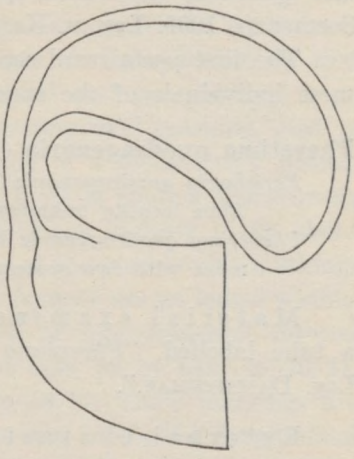


Fig. 5. *Pheretima quadragenaria*. Ental end of another spermathecal diverticulum, × *ca.* 95.

Remarks. — The specimen described above differs from the specimens referred, on a previous page, to *P. capensis* in several respects. These differences may or may not be of specific significance. As has been noted previously, *capensis* and *quadragenaria*, at present, cannot be satisfactorily distinguished from each other. Michaelsen's identification is accepted in this case simply because the spermathecal diverticulum appears to be more like that figured by Perrier than that of *capensis*.

Many of the specimens which Michaelsen referred to *quadragenaria* (1922, p. 60) are quite obviously abnormal, lacking prostates and spermathecal diverticula or with stunted or deformed prostates, prostatic ducts, and spermathecal diverticula. Similar abnormalities are now known to be of rather frequent occurrence in certain species of *Pheretima*. It is at least possible that in the *capensis-quadragenaria* complex we have to do, at least in part, with a series of forms, each of which is more or less divergent from a specific norm that is not yet obvious.

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COLÉOPTÈRES LAMELLICORNES COPROPHAGES DE L'ÎLE DE KANGEAN.

Par

RENAUD PAULIAN

(Paris).

Une chasse assez importante de l'île de Kangean m'a été soumise dernièrement par M. R. Oberthür de Rennes. Comme il s'y trouve plusieurs espèces intéressantes j'ai pensé qu'il valait la peine d'en donner une étude détaillée. A part quelques captures faites sur la côte, d'espèces qui d'ailleurs se retrouvent à l'intérieur, toutes les captures proviennent de la région de Petapan.

Gymnopleurus maurus Sharp. — Nombreux exemplaires de la forme brun bronzé. C'est une espèce commune dans l'archipel malais mais que Boucomont n'a pas signalée de Java.

Onitis spinipes Drury. — Assez rare espèce signalée de tout l'archipel malais, d'Indochine et de Chine.

Catharsius timorensis var. **kangeanus** nov. — Les *Catharsius* du groupe *molossus* comprennent dans l'archipel malais plusieurs espèces d'une étude assez difficile. Dans le groupe étroit formé par les espèces à pubescence claire il a été décrit par van Lansberge deux espèces nouvelles. Dans son étude sur les Coprophages de l'archipel malais Boucomont rattache l'espèce des Florès (*timorensis*) à *molossus* en qualité de variété et dit de *dayacus* de van Lansberge "D'après la description, parait être un individu minor un peu aberrant de *molossus*". Dans sa faune entomologique de l'Indochine française il rattache à *molossus* comme simples variétés et *timorensis* et *dayacus*. Dans sa faune des Indes anglaises Arrow ne donne pas de synonymie pour *molossus*, cependant comme il ne décrit pas la forme *dayacus* que l'on rencontre aux Indes (par exemple dans le Darjeeling) il est probable qu'il considère cette espèce comme synonyme de *molossus*.

Il est indiscutable que toutes ces formes sont extrêmement difficiles à séparer. En pratique les femelles sont inséparables et il en va de même pour les petits développements de mâles. Pour les mâles de plus grande taille la séparation est très nette (fig. 1). Cependant il est à noter que les plus grands mâles appartiennent sans exception au type *molossus* sensu

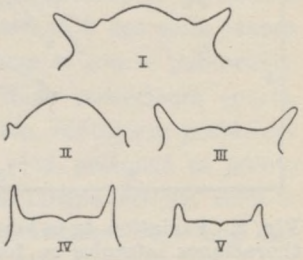


Fig. 1. Aspect schématique de la carène thoracique chez les mâles bien développés de *mollossus* (I), *borneensis* (II), *timorensis* (III), *timorensis* var. *kangeanus* (IV) et *dayacus* (V).

stricto. On pourrait alors être tenté de voir là un cas d'allomètrie ou, en adoptant la nomenclature que j'ai proposée en 1935, un cas de polymorphisme trophique. S'il en est ainsi, dans la mesure où ces formes seront localisées on pourra les considérer comme des races. Au cas où leurs aires se recouvriraient on ne pourrait alors les séparer avec raison. Le seul moyen de résoudre cette question était de procéder à une série de mensurations. Le résultat de mesures faites sur plusieurs centaines d'individus, dont les types, provenant de la collection OBERTHÜR sont consignés dans le graphique ci contre (fig. 2). On voit que l'analyse quantitative permet de séparer cinq formes. En appliquant à ces formes l'équation: $y = bx^{\alpha}$ qui a été prosposée il y a longtemps déjà pour les cas d'allomètrie, on obtient les valeurs suivantes pour les paramètres b et α. (Tableau I).

Tableau I.

	b.	α.
timorensis	0,03	2,07
dayacus	0,05	1,87
dubius	0,12	1,50
molossus	0,39	1,04
borneensis	0,90	0,66

On voit que ces formes sont parfaitement distinctes. Si au lieu de mesurer la longueur des cornes latérales du thorax on mesurait la longueur du lobe médian on obtiendrait des graphiques analogues à ceci près que la position relative des diverses espèces serait modifiée.

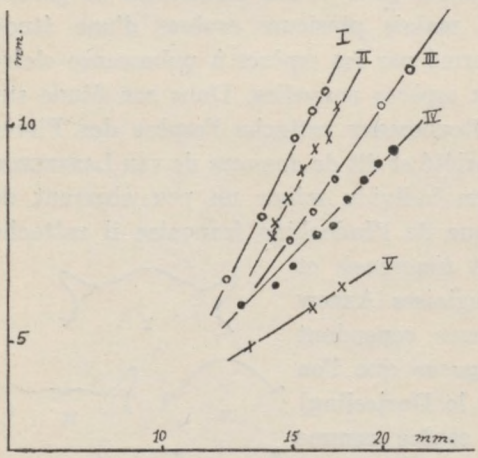


Fig. 2. Variation de la longueur des cornes thoraciques laterales en fonction de la longueur élytrale chez *timorensis* (I), *dayacus* (II), *dubius* (III), *molossus* (IV) et *borneensis* (V). Coordonnées logarithmiques.

Ces faits justifient la séparation du groupe *molossus* en cinq espèces qui sont du reste jointives, et dont deux sont nouvelles.

Le **Catharsius borneensis** n. sp. est une espèce que je ne connais que de Bornéo: Pontianak, type dans la collection OBERTHÜR.

Le **C. dubius** n. sp. est très difficile à séparer à l'examen simple de *molossus* type, il est répandu au Sikkim, en Annam et en Cochinchine.

Le *C. molossus* type est répandu à Java et dans toute l'Asie méridionale.

Le *C. timorensis* SHARP, est répandu dans les îles de Bali à Timor. Il a été signalé de Bornéo et d'Indochine mais je n'en ai pas vu d'exemplaires de ces régions. La var. *kangeanus* nov. se distingue de la forme typique par l'orientation

des cornes du thorax qui sont parallèles alors que chez *timorensis* elles sont assez fortement divergentes. Ce caractère est constant pour tous les specimens que j'ai pu examiner.

Enfin *C. dayacus* Lansb. est une espèce répandue partout où l'on trouve le *C. molossus* type mais elle est particulièrement abondante dans l'archipel malais ou justement *C. molossus* est assez rare.

Comme je n'ai pu trouver aucune autre différence entre ces espèces que celles résultant de l'étude biomètrique et qu'en particulier les pièces génitales de toutes les formes sont identiques il serait superflu d'en donner des diagnoses plus détaillées.

Onthophagus rudis Sharp. — Un exemplaire dont les plaques lisses du thorax sont approfondies et fovéolées comme dans un exemplaire de Darjeeling signalé par Boucomont.

O. sp.? — Trois exemplaires d'un petit *Onthophagus* noir brillant, apex et épaules des élytres rouges, avant corps cuivreux. Thorax à ponctuation forte, tête avec deux fortes et courtes carènes. Thorax vaguement rétus en avant. Elytres à stries ponctuées et interstries ponctués irrégulièrement sur deux rangs.

O. kangeanus n. sp. — Espèce prenant place dans le 16ème groupe de Boucomont.

Corps court, convexe, noir, élytres tachés de rouge à l'épaule et à l'apex. Tête à peine tronquée antérieurement, non sinuée à la jonction de l'épistôme et des joues, entièrement couverte d'une ponctuation forte et assez serrée devenant rugueuse en avant. Carène clypéale longue, atteignant les sutures génales qui sont carènées. Une trace de carène sur le vertex au niveau du bord postérieur des yeux. Base du thorax à peine perceptiblement angulée au milieu. Thorax très convexe, à ponctuation assez forte et moyennement dense, élargi en courbe régulière des angles antérieurs qui sont obtus jusque vers le milieu, très fortement rétréci ensuite, légèrement sinué avant les angles postérieurs où s'arrête le rebord latéral. Elytres à stries nettes, ponctuées, et interstries plans, ponctués sur deux rangs, les points donnant naissance à des soies jaunes très courtes. Pygidium à ponctuation forte et assez éparse et courte pubescence jaune très éparse. Tibias antérieurs quadridentés. Tibias postérieurs courts, éperon des tibias postérieurs aussi long que le tiers du tibia. Métatarse postérieur très long, courbé en faucille, plus long que le reste du pied, prolongé en pointe à son extrémité inférieure au delà de l'insertion du deuxième article, celui-ci court, triangulaire, plus long que le suivant lui même nettement plus long que le 4ème. Le dernier article allongé, très aplati, un peu plus long que la moitié du premier article et terminé par deux très fortes griffes.

Long. 5 mm.

Type 1 exemplaire, coll. R. Oberthür.

Par ses stries ponctuées cette espèce se rapproche de *deliensis* Lansb. espèce de Sumatra et de Malacca, mais elle s'en sépare par les intervalles à ponctuation normale et par la tête à ponctuation forte.

Aphodius biseriatus SCHMIDT. — Une belle série de cette espèce connue par ailleurs de l'Inde et de Soembawa.

A. reichei HAR. — Espèce de l'Indochine et de tout l'archipel malais jusqu'en Australie.

A. amoenus BOH. — Espèce de toute l'Asie méridionale et du sud de l'Afrique.

A. urostigma HAR. — Même répartition.

A. lividus OL. — Cosmopolite.

Pterorthochaetes sp.? — Plusieurs exemplaires d'une espèce de ce genre. Le travail que GESTRO leur a consacré ne permet malheureusement guère d'obtenir des déterminations précises.

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A NEW GENUS AND SPECIES OF *LIBELLULIDAE* FROM CELEBES (Odon.).

By

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(Zoölogisch Museum, Buitenzorg).

In July 1936 Dr. L. J. TOXOPEUS of Bandoeng (Java) returned from a collecting-trip to South and Central Celebes. Amongst many interesting Odonata turned over to me for examination, there is one very peculiar form which represents a new genus of the archaic and interesting tribe *Tetrathemini* of the family *Libellulidae*. I am thankful to Dr. TOXOPEUS that he has been willing to entrust me with the study of his material, which contains a number of species not previously known from Celebes.

Although no general paper on the Odonata of Celebes has ever been published, in recent years very great strides have been made in our knowledge of these insects, and material of a good many additional species has accumulated in the Buitenzorg Museum. Therefore, in a subsequent paper, I hope to publish a list of the known dragonflies of Celebes, and the opportunity will then be taken to describe some more new species and also to give notes on others.

The present paper deals only with the new genus discovered by Dr. TOXOPEUS.

Genus **Celebophlebia,** gen. nov.

Of the *Tetrathemini*.

Stature of *Nannophlebia*. — Head small, strongly globular, eyes more transverse than in *Nannophlebia* and median eye-line very short, barely as long as the vertex. Frons very little projecting, completely rounded; furrow shallow and only indicated on the upper portion. Vertex raised, obtuse-triangular in frontal view.

Prothorax with the posterior lobe rather small, rounded, very shallowly notched on middle, elevated and with long soft pile along margin.

Legs moderately robust, femora comparatively strong. Posterior femora with short and scanty hairs, their inner margin finely serrate: a row of 18 - 20 minute conical teeth, progressively longer from shortly after the base to the apex, and a single, short terminal spine. Middle femora with a row of about 15 interior spines, increasing rapidly in length towards the end. Anterior femora with a similar row of 6 spines, which are restricted to the middle of the length. Armature of tibiae similar to *Nannophlebia*. Tarsal claws toothed.

Wings narrow and very long, neuration rather dense, anal area narrow in both pairs. In the anterior pair the nodus is placed slightly distal (17 : 16),

in the hinder pair slightly proximal to the middle (14.5: 16.5) of the wing. Triangle in front wing with the costal side fractured, the two portions about equally long; triangle of hind wing normal, proximal side coinciding with arculus and much shorter than costal side. Sectors of arculus united for a long distance, and then separating sharply at an acute angle, the stalk arising from the lower end of it. Arculus placed mid-way between Ax_2 and Ax_3. In front wing Cu_1 and Cu_2 arise from a single point at the anal angle of the triangle; in hind wing these veins are widely separated and Cu_1 originates from the middle of the distal side of *t*. Last antenodal cross-vein complete, 10 in front wing, 9 in hind wing; postnodals 8 - 9. M_2, *Rs* and M_3 with a shallow costal convexity. One row of cells between *Rs-Rspl*, *Rspl* weakly indicated. One supplementary bridge cross-vein (*Bxs*) in all wings. 1 + 1 *Cux* in front wing, 2

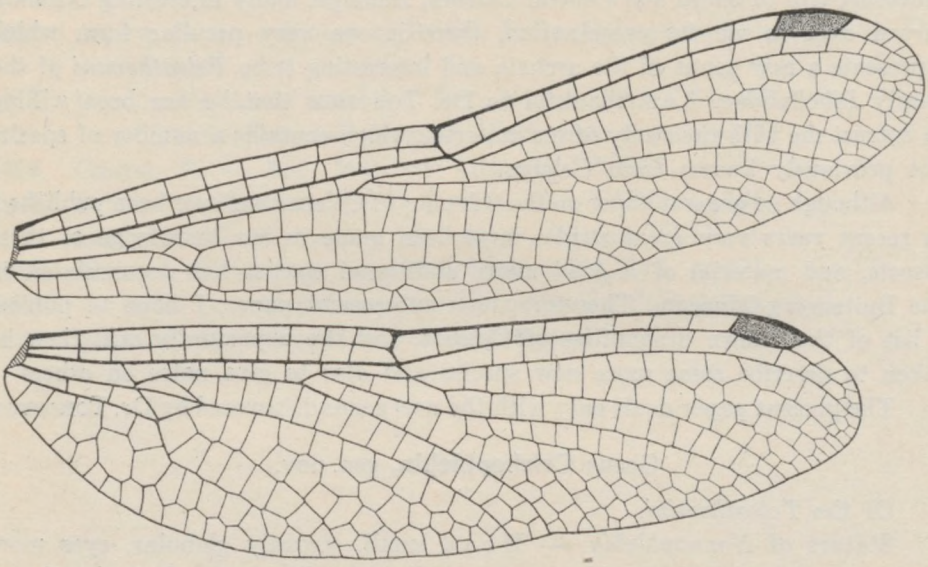


Fig. 1. *Celebophlebia dactylogastra*, gen. et spec. nov. ♂. Right pair of wings.

in hind wing. All triangles and hypertriangles uncrossed. No normal subtriangle: Cux_2 widely distant from arculus in hind wing. Cu_1 and Cu_2 in front wing straight; discoidal field consisting of only one row of cells, and distinctly narrowed towards the wing-margin. Anal loop present, though irregular in outline, consisting of 4 cells. Pterostigma small. Membranula absent in front wing, replaced by a tuft of soft hairs in hind wing (not shown in fig. 1).

Abdomen of male cylindrical, slender and spindle-shaped; basal segments much inflated dorso-ventrally, less so in lateral dimension. Tenth abdominal segment very small.

Genitalia of second segment prominent. Lobus anterior very small. Hamulus strongly modified and of enormous size. Genital lobe narrow.

Anal appendages with the superior pair longer than the inferior one, about equal in length to the ninth segment of abdomen.

Female unknown.

Genotype: *Celebophlebia dactylogastra*, sp. n.

Habitat: Celebes.

Celebophlebia dactylogastra sp. n. (fig. 1 - 2).

Material studied: — One male (adult), S.W. Celebes, northeastern slope of Quarles Mts., Todjamboe, 1000 m alt., July 17, 1936, L. J. Toxopeus leg.

Male (holotype). — Labium yellow-green, the median lobe very small, and indistinctly bordered with black; lateral lobes with a narrow black stripe, slightly widening basally, along the inner margin of each, and distal margin also finely lined with black, mesially; the black marking thus formed is rather vase-shaped and occupies only the median one-seventh of the labium. Labrum bordered with black along its entire margin so as to enclose two large, squarish green basal spots, which are separated from each other by a heavy, longitudinal, black bar. Mandible-bases and clypeus green. Frons green with a heavy, trilobate, shiny black basal spot, covering the greater part of the surface; the lateral divisions of this spot descend along the margin of compound eyes, ceasing abruptly at about two-thirds of their way down; median division still broader, expanding a little sidewards apically and fitting close against the clypeal suture. Vertex glossy black; ocelli reddish. Eyes brown. Occiput black, shiny, with a yellow twin-spot on middle. Rear of the head glossy black with no other pale markings than a small, reniform, yellow side-spot along the eye-margin.

Prothorax black with traces of yellow spots along anterior lobe and the sides of the median lobe; posterior lobe elevated, yellow with a brownish basal spot upon middle; pile yellow.

Ground-colour of synthorax deep black; a broadly elongate, green humeral band, continuous over most of the mesinfraepisternites, but narrowing and not touching the ante-alar sinuses above, clear green. Sides with two very broad bands of the same colour, covering most of the metepisternum and the posterior three-fourths of the metepimerum. The green humeral band is equal in width to the black fascia posterior to it but the black stripe along second lateral suture is much narrower and ventrally meets its fellow of the opposite side. Thorax otherwise green underneath.

Legs long and slender though more strongly built, comparatively, than in *Nannophlebia*. Coxae and trochanters green. Basal two-thirds of posterior femora with a yellow-green stripe on both sides; middle femora black, save for a narrow basal yellow ring; anterior femora black with the basal two-thirds yellow interiorly. Outer surfaces of hind tibiae bright ochreous, inner surfaces yellow-brown; remainder of legs all black.

Wings shaped as for genus, neuration as described earlier and as appears from fig. 1. Membrane sub-hyaline, unspotted. Pterostigma brownish-black, 2.3 mm long. Nodal index $\frac{9\ 10.10.8}{9.\ 9.\ 9.8}$.

Abdomen very slender, shaped as in most species of *Nannophlebia*. Colouring mainly black. Segm. 1 with the sides and a small triangular dorsal spot green; 2 also green, with the exception of narrow basal and terminal black streaks, both of which are widest on middle and restricted to the dorsum. Tips of genital lobe and hamulus black. Segm. 6 black, ringed with green or ochreous. On segm. 3 the green marking is largest, covering slightly less than the middle of the sides; anteriorly, it is limited by a line that runs obliquely upwards from near the lower basal edge of the segment to the transverse suture but, posteriorly, it is cut-off transversely, so that the ring is almost separated on mid-dorsum into two parts. On segm. 4 - 6 the rings are placed approximately on middle, occupying about one-fourth of their length, those on segm. 4 - 5 being rather constricted mid-dorsally. Segm. 7 black, dorsum with a small ochreous twin-spot on middle. Remaining segments black, unmarked.

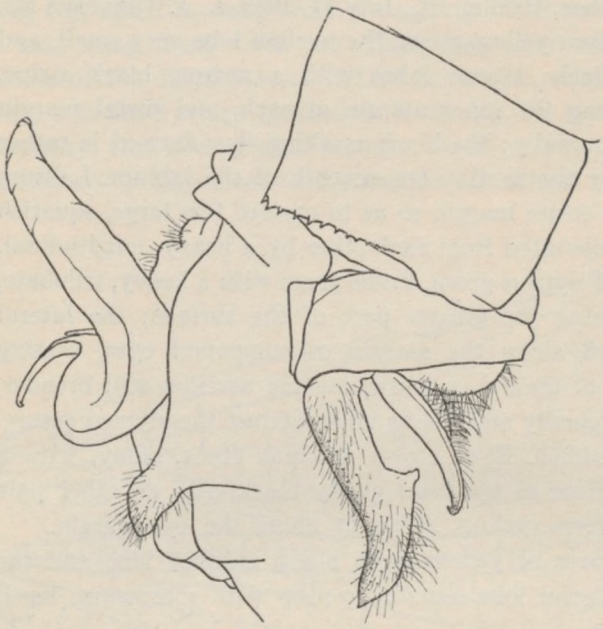


Fig. 2. *Celebophlebia dactylogastra*, gen. et spec. nov. Male. Left side view of genitalia and right side view of anal appendages.

Genitalia very prominent. Lobus anterior short and broad, sparsely pilose, depressed, distal margin a little swollen and very slightly notched on middle. Hamulus of enormous size; basal portion of exterior branch in the form of a disk-like, somewhat oblique and outcurved circular plate, its lateral portion prolonged into a conspicuous finger-shaped process, which is curved anterad and strongly mesiad so that the apex meets its fellow on the opposite side; in profile view these long hamular processes are cylindrical in form and coloured shiny black, while interiorly, they are strongly hollowed out. The interior branches of the hamulus are in the form of very slender, contiguous, and evenly curved hooks, black in colour, the tips of which are slightly outcurved. Genital lobe long and narrow, tips rounded and almost meeting ventrally.

Anal appendages yellow, much longer than tenth abdominal segment, rather small. Superiors in dorsal view separated at base, thence a little incurved, continuously equidistant but closely approximated, with pointed tips; in profile view shaped as in fig. 2. Inferior appendage much shorter than upper pair, triangular in outline. Superior appendages with a diffuse, blackish-brown

stripe over the entire length and with the apices also black; inferior one black-tipped.

Length: abd. + app. 28, hind wing 30, pterostigma 2.3 mm.

Among many other characters this remarkable species differs from the Tetrathemine genera *Tetrathemis, Nannophlebia* and *Archaeophlebia* in that the line of contact between the compound eyes is extremely short, thus resembling other primitive genera of the same group, e.g. *Hypothemis, Bironides, Hylaeothemis* and *Eothemis*. Yet *Celebophlebia* is, I think, more closely related to *Nannophlebia* than to any of the last mentioned genera and evidently is the most archaic of the two. Venationally, it differs from *Nannophlebia* by the greater number of cross-nerves between the anterior longitudinal wing-veins, by the presence of more than one cubito-anal cross-vein, by the supplementary bridge cross-nerve, and by the absence of a membranula. The three first mentioned characteristics are considered decidedly archaic, while the absence of a membranula is apparently shared only by the most primitive member of the tribe, viz. *Hypothemis* (Fiji Islands). The membranula of *Celebophlebia* being replaced by a small tuft of hairs is quite unique in the *Libellulidae*.

Further points of difference between our new genus and *Nannophlebia* are found in the extraordinary development of the genital hamule and the great reduction of the anterior lobe of the genitalia, two features shared also by *Hypothemis*, from which, however, it differs widely in a number of other characters.

I am inclined to give *Celebophlebia* a place under Group I, paragraph I, 1 B in RIS's key to the genera, between *Archaeophlebia* and *Nannophlebia* (see RIS, Cat. Coll. SELYS, Libellulinen, fasc. 9, 1909, p. 17 - 18).

A Synonymic Note on *Celebothemis delecollei* RIS. — Advantage may be taken of the present occasion to adjust a case of synonymy in the family Libellulidae.

In *Treubia* 8, 1926, p. 470 - 471, Col. F. C. FRASER established a new genus *Parathemis*, with *metallica*, sp. n. as genotype, a species that was held by its creator to come from Java.

Since considerable doubt had arisen as to the habitat of this species, it was omitted from the author's "Annotated List of the Odonata of Java" (*Treubia* 14, 1934, p. 451), and since moreover the type must be considered as lost, the question of its affinities remained undecided.

The collection made for me by Dr. TOXOPEUS in Celebes contains a number of *Celebothemis delecollei* RIS in excellent condition, and comparing these with the description and sketch of *Parathemis metallica* in Col. FRASER's paper, I soon noticed that the males of *Celebothemis* apply very well to the description of *P. metallica*, so obviously in fact, that there can be no doubt as to their being conspecific.

In the FÖRSTER collection, now in the University Museum of Michigan, Ann Arbor, is a male of *Celebothemis delecollei*, labelled by FÖRSTER himself *Neonyx nitens*. I am not aware of this name having been used in literature but, if so, it should be considered also a synonym of *Celebothemis delecollei* RIS.

HERPETOLOGISCHE NOTIZEN XVI-XVII [1].

XVI. Ueber eine degenerative Aberration bei *Ptyas korros* (Schlegel).

Von

Dr. F. KOPSTEIN
(Magelang, Java).

Herr W. Helwig in Sapoeran bei Wonosobo (Mitteljava) war so freundlich, mir ein albinotisches Exemplar von *Ptyas korros* (Schlegel), welches in der Umgebung seines Wohnortes, in ± 770 m Höhe gefangen wurde, leihweise zum Studium zu überlassen. Dieses Exemplar zeigt eine in doppelter Hinsicht auffallende Aberration. Nicht nur, dass es einen bei indo-australischen Reptilien sehr selten beobachteten Hypochromatismus darstellt, gehen mit dem Farbstoffmangel auch ausgebreitete, pathologische Begleiterscheinungen parallel, welche sich in einer Veränderung des Schädelskelettes und einer abweichenden Kopfbeschildung manifestieren.

Beschreibung des lebenden Exemplares:

Sq. 15-15-11; V. 173 + 1/1; Sc. 80/80 + 1. Die Schwanzspitze scheint abgebrochen und narbig verheilt zu sein. Sie ist durch ein etwa 10 mm langes, horniges Gebilde ohne Schuppenbildung gekennzeichnet.

Der Kopf ist völlig anders geformt als bei normalen Individuen. Er ist — wie Pl. 15 fig. 2-3 zeigen — vorne breit abgestumpft. Der Oberkiefer greift nicht über den Unterkiefer, sondern sein vorderer Rand steht in beinahe gleicher Höhe mit letzterem. Die vor den Augen gelegene Schädelpartie ist merkbar kürzer und höher als normal. Das Auge ist viel grösser als bei einem gleich langen, nicht teratologischen Exemplar derselben Art. Der Kopf erscheint weniger deutlich vom Halse abgesetzt.

Alle Kopfschuppen sind unregelmässig geformt und mit Dellen bedeckt. Ein Rostrale fehlt. An seiner Stelle greifen die Nasalia und Internasalia flügelförmig nach vorne. Der hintere Rand der Internasalia bildet keine gerade Linie, sondern ist unregelmässig gestaltet. Ihre äusseren Ecken greifen, wie bei Körperschuppen, über den vorderen Rand der Praefrontalia. Die Nasenlöcher sind grösser und tiefer als normal; der distale Rand der Nasalia greift ebenfalls schuppenförmig über das vordere Loreale. Internasalia kürzer als die Praefrontalia. Frontale länger als sein Abstand vom Schnauzenende, etwas kürzer als die Parietalia. 2 Lorealia, das vordere grösser als das darauffolgende. Das Praeoculare ist mit dem Supraoculare zu einem unregelmässigen Schild verwachsen. Darunter liegt jederseits ein kleines Schild in Form und Grösse eines Loreale, berührt jedoch das Auge. Ein kleines Suboculare vorhanden. 2 kleine, unregel-

[1] Cfr. Treubia, X, p. 467; XI, p. 301; XII, p. 273; XIII, p. 1; XIV, p. 73 und 78; *15*, p. 51, 151 und 255.

mässig geformte Postocularia, deren oberes teilweise mit dem Temporale verwachsen ist. Temporalia 2 + 2. Supralabialia 8 (4, 5).

Mentale klein. 5 Sublabialia berühren das vordere Kinnschildpaar. Dieses etwas kürzer als das 2. Paar. Schuppen glatt, ohne Kiele. Länge 157 cm.

Die Oberseite des Halses ist hell gelb mit rötlichen Punkten oder Flecken auf den Schuppenenden. Auf der Körpermitte ist die Dorsalregion ungefähr gleich der Halsoberseite gefärbt und gezeichnet. Seitlich aber sind die Schuppen blass graugrün mit lichten Rändern, sodass die Schlange hier Spuren einer Längststreifung aufweist. Das letzte Rumpfdrittel und der Schwanz sind rötlichgelb, dorsal mit weissen Schuppenrändern. Auf dem Rücken einzelne kleine, unsymmetrische, schwarze Flecke von der Grösse 1/10 - 1/5 Schuppe. Die Unterseite zeigt das für *Pt. korros* charakteristische, leuchtende Gelb. Seitlich tragen die Ventralia blass-grau-grüne Enden. Iris blassrot, Pupille tief albinotisch rot.

Wie dieser Hypochromatismus terminologisch aufgefasst werden muss, kann wegen der Seltenheit derartiger Erscheinungen noch nicht festgestellt werden. Als Albino darf er jedenfalls nicht eingeordnet werden, da der Pigmentmangel unvollständig ist. Melanin ist in einzelnen Resten, Lipochromgelb in grosser Ausbreitung vorhanden. Solange die Farbaberrationen bei Reptilien nicht an einem grossen Material studiert werden können, glaube ich diese Form von Farbstoffmangel als Flavismus bezeichnen zu müssen. Immerhin ist der Unterschied gegenüber Albinismus bloss graduell.

Das Farbenbild veränderte sich nach einer im Februar 1936 stattgefundenen Häutung nicht.

Ob die viel langsameren Bewegungen dieses Exemplares, seine geringere Reizbarkeit ebenfalls als degeneratieves Merkmal, oder als Einfluss der Domestikation aufgefasst werden müssen, lässt sich kaum entscheiden. Ich möchte sie eher als Degeneration qualifizieren, weil *Ptyas korros* sich im allgemeinen schwer oder gar nicht an den Pfleger gewöhnt, und in der Gefangenschaft nicht selten gerade eine Übererregbarkeit annimmt.

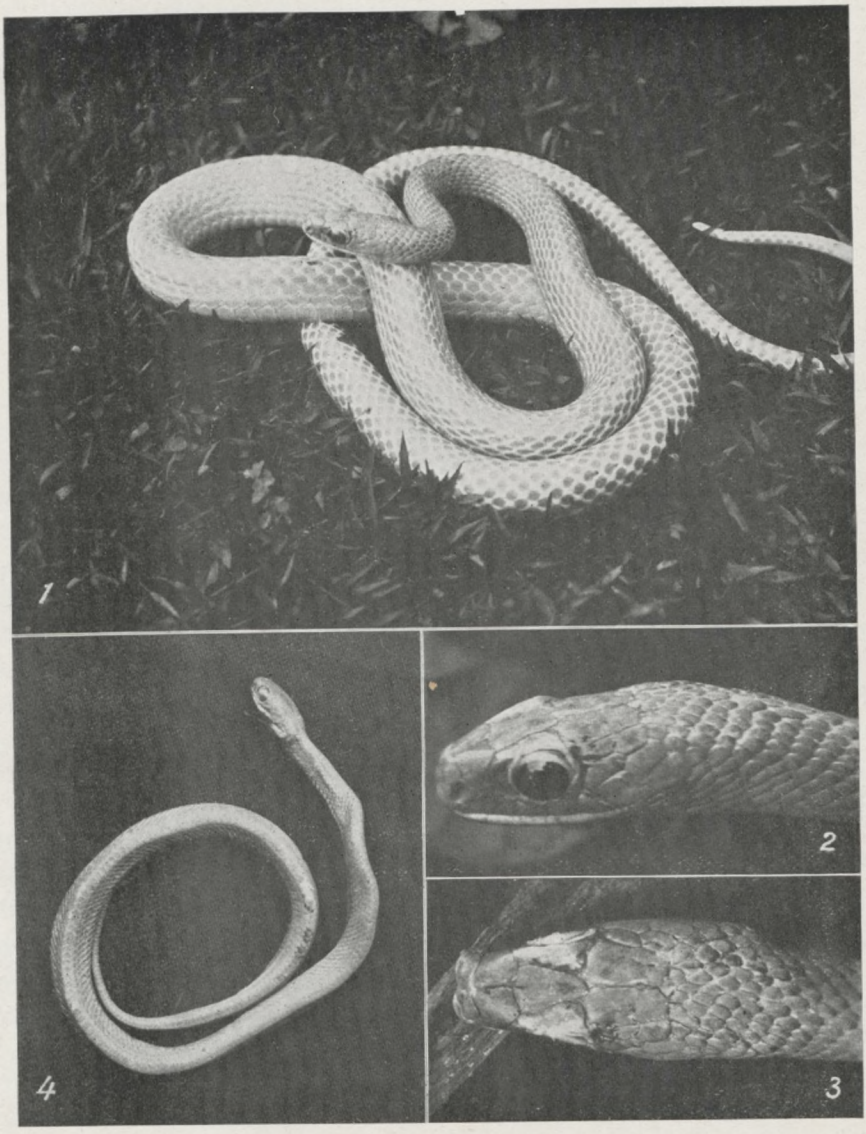
XVII. Ueber einen Fall von Albinismus bei *Amblycephalus carinatus* (WAGLER).

Dieses Exemplar wurde im Jahre 1931 von Herrn C. P. J. DE HAAS bei Tjibatoe in West-Java, in ± 700 m Höhe gefangen. Es stellt, soweit mir bekannt ist, das erste Albino dar, welches bei einer Schlange im indo-australischen Archipel gefunden wurde.

Diagnose: Sq. 15-15-15; V. 185 + 1; Sc. 70/70 + 1.

Totale Länge 236, Rumpf 193, Schwanz 43 mm. Die Länge entspricht einem etwa 40 Tage alten Tiere.

Frontale viel länger als breit, länger als die Parietalia, doppelt so lang als sein Abstand von der Schnauzenspitze. Die Form des Frontale weicht also von der Norm beträchtlich ab. Andere Abweichungen, wie sie bei Albinismus nicht selten sind, wurden bei diesem Exemplar nicht konstatiert.



F. KOPSTEIN: Herpetologische Notizen XVI - XVII.

Fig. 1. Ein Fall von Flavismus bei *Ptyas korros* (SCHLEGEL). Fig. 2 - 3. Kopfansicht von *Ptyas korros*, von der Seite und von oben. Zeigt deutlich das ungewöhnlich vergrösserte Auge und die breit abgestumpfte Schnauze. Fig. 4. Albino von *Amblycephalus carinatus* (WAGLER).

CARDIODECTES HARDENBERGI, EIN NEUER PARASITISCHER COPEPODE AUS DER JAVA SEE.

Von

A. P. MARKEWITSCH

(Leningrad).

Dank der Liebenswürdigkeit des Herrn Dr. J. D. F. HARDENBERG, Direktor des Laboratoriums für Meeresuntersuchung, (Laboratorium voor het Onderzoek der Zee, Batavia, Java) habe ich mehrere in der Umgegend von Batavia im J. 1928 gesammelte Exemplare von *Stolephorus heterolobus* RÜPP. (*Pisces*) erhalten. Vier Fische erwiesen sich mit Vertretern der hier beschriebenen Art infiziert. Dabei befand sich an jedem infizierten Fische bloss ein Parasit (♀). Die parasitischen Krebse sassen an der Körperseite mit dem Kopf in die Haut des Fisches vergraben. Infolgedessen erwiesen sich die befallenen Stellen zu kleinen beulenartigen Anschwellungen umgewandelt. An den Anschwellungen konnte man gleich das Vorhandensein der Parasiten feststellen, auch in den Fällen, wo der frei herabhängende Teil des Körpers abgerissen war. Bei näherer Untersuchung stellte es sich heraus, dass die erwähnten Krebse zu einer neuen Art, der Gattung *Cardiodectes* WILSON, 1917 gehören. Diese Gattung zeichnet sich, vor allen Dingen durch das Vorhandensein verzweigter, den Vorderteil des Kopfes deckender Frontalforsätze und durch weiche, feine seitlich davon abgehenden, Auswüchse aus [1]).

Ich ergreife hier die Gelegenheit um Dr. J. D. F. HARDENBERG für die Zusendung des obenerwähnten Materials meiner innigsten Dank auszusprechen und erlaube mir ihm diese neue Art zu widmen.

Fam. **LERNAEIDAE.**

CARDIODECTES WILSON 1917.

C. hardenbergi nov. sp.

Der Kopf zeichnet sich durch das Vorhandensein von zwei Paar grossen lateralen Auswüchsen und durch dichotomisch verzweigte Frontalfortsätze aus. Letztere stellen ein ziemlich kompaktes Gebilde, von ovaler Form, dar. Die

[1]) Es sei hier auf einen die Gattung *Cardiodectes* betreffenden Widerspruch in der Monographie von WILSON (1917) hingewiesen. In der Bestimmungstabelle der Gattungen (pg. 32 - 33), wird nähmlich auf das Fehlen der lateralen Auswüchse hingewiesen. Anderseits erwähnt aber der Verfasser bei der Beschreibung der Gattung selbst und der Gattung *Cardiodectes* angehörender Arten das Vorhandensein dieser Auswüchse.

lateralen Auswüchse sind weich, fein, mehr oder weniger afgebläht. Ihre Form steht der sphaerischen sehr nahe. Die Auswüchse des hinteren Paares sind ihrem Masse nach bedeutend grösser als die des vorderen und biegen etwas nach der Ventralseite hin, in Form von röhrenförmigen oder saugförmigen Gebilden um. Der von den Frontalfortsätzen gebildete eiförmige Körper besteht aus zwei gleichen an einander eng anliegenden Hälften, deren basale Teile voneinander vollständig abgesondert sind. Die erwähnten Frontalfortsätze reichen weit über den Vorderrand des Kopfes hinaus, während sie sich nach hinten nur bis zum 1 - 2 Schwimmfusspaar erstrecken. Die miteinander verschmolzenen Brustsegmente bilden einen verhältnissmässig kurzen, engen Hals, der eine kleine Krümmung aufweist. Der Rumpf ist zylindrisch, sich etwas gegen das Vorderende verschmälernd, und hinten steil abgerundet. Die Länge des Rumpfes übertrifft ca. 3 mal den grössten Durchmesser. Das Abdomen ist durch einen sehr kleinen, von der Dorsalseite abgehenden Höcker vertreten.

Die Eiersäcke sind lang, schmal, zylindrisch und mit abgeplatteten Eiern gefüllt, die, einreihig angeordnet, einander eng anliegen. An Länge übertreffen sie die Gesamtkörperlänge bedeutend.

Die Antennen sind sehr klein und gehen vom Vorderrande des Kopfes, nahe an der Oberseite ab. Die ersten Antennen sind in die Länge gezogen, undeutlich gegliedert und mit langen dünnen Borsten versehen. Ihnen schliessen sich eng die zweiten Antennen an, die das Aussehen einer Klaue haben. Die Zweiten Antennen sind zweigliederig; das Basalglied ist schmäler als das Endglied.

Letzteres ist mit einer machtigen sichelförmigen Kralle bewaffnet, deren Spitze auf die Innenseite eines groszen dornartigen Fortsatzes stöszt. Dieser entspringt an der oberen Ecke des Gliedes. Der vordere, freie Rand des zweiten Gliedes ist mit sehr kleinen Dörnchen besetzt.

Die Mundröhre (proboscis) ist kurz, zylindrisch und ventral gerichtet. Ihr freier Rand ist mit ausserordentlich winzigen Dörnchen besetzt. Neben dem Rüssel befinden sich die kleinen, sich gegen das Distalende merklich verschmälernden, Maxillen. Das Basalglied ist schlank und am längsten. Ungefähr von der Mitte dieses Gliedes entspringt ein warzenartiger Dorn. Das zweite Glied ist merklich kleiner als das erste. Es ist etwas gebogen und geht unmittelbar in eine schwach gebogene, kurze und stumpfe über.

Die Schwimmfüsse sind sehr klein, deutlich gegliedert und mit mächtigen Borsten versehen. Die ersten zwei Schwimmfusspaare schliessen sich eng einander an und sind zwischen dem hinteren lateralen Kopfauswüchsen gelegen. Das dritte Paar befindet sich unweit der beiden ersten, ungefähr auf der Höhe des Hinterrandes der lateralen Auswüchse. Die Basalglieder eines jeden Paares sind mit einander durch eine Chitinkommissur verbunden.

Die Füsse der beiden ersten Paare sind zweiästig, während von dem Basalglied des Dritten bloss ein Ast abgeht. Die Äste sind kurz, deutlich zweigliederig und mit Dornen und langen Borsten bewaffnet.

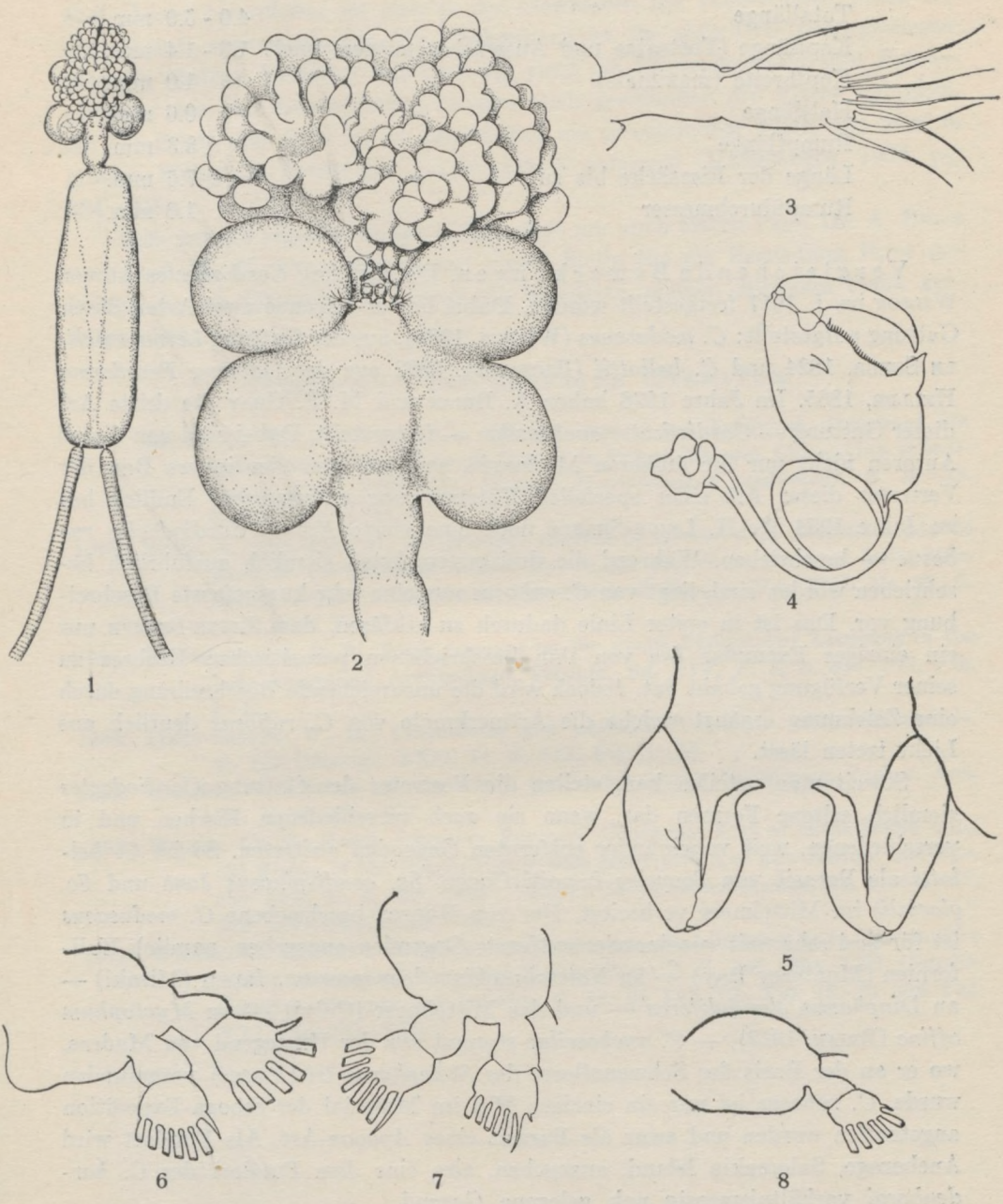


Fig. 1. *Cardiodectes hardenbergi* n. sp. erwachsenes, eiertragendes ♀ von unten gesehen. Fig. 2. Vorderende von *C. hardenbergi* n. sp. (♀) von oben gesehen. Fig. 3. Die erste Antenne von *C. hardenbergi*. Fig. 4. Die zweite Antenne von *C. hardenbergi*. Fig. 5. Die Maxille von *C. hardenbergi*. Fig. 6. Erster Schwimmfuss von *C. hardenbergi*. Fig. 7. Zweiter Schwimmfuss von *C. hardenbergi*. Fig. 8. Dritter Schwimmfuss von *C. hardenbergi*.

Ausmasse.

Totallänge	4.9 - 5.0 mm.
Kopflänge (Fortsatze und Auswüchse mitgerechnet)	1.3 - 1.4 mm.
Kopfbreite (maximale)	1.0 mm.
Halslänge	0.6 mm.
Rumpflänge	3.3 mm.
Länge der Eiersäcke bis zu	7.5 mm.
Rumpfdurchmesser	1.0 mm.

Vergleichende Bemerkungen. Die Gattung *Cardiodectes* ist von WILSON im J. 1917 festgestellt worden. Dabei hat er folgende zwei Arten dieser Gattung aufgestellt: *C. medusaeus* (WILSON, 1908), aus der Gattung *Lernaeenictis* LE SUEUR, 1824 und *C. bellottii* (RICHARDI), 1882 aus der Gattung *Peroderma* HELLER, 1865. Im Jahre 1928 haben A. BRIAN und M. P. GRAY die dritte Art dieser Gattung — *Cardiodectes anchorellae* — festgestellt. Dabei sind von diesen Autoren nicht nur die äusseren Merkmale, sondern auch der innere Bau der Vertreter dieser Art einer speziellen Untersuchung unterworfen. Endlich hat im Jahre 1934 W. H. LEIGH-SHARPE noch eine vierte Art — *Cardiodectes rubosus* — beschrieben. Während die drei ersten Arten ziemlich ausfuhrlich beschrieben worden sind, liegt von *C. rubosus* nur eine sehr kurzgefasste Beschreibung vor. Das ist in erster Linie dadurch zu erklären, dass LEIGH-SHARPE nur ein einziges Exemplar des von ihm beschriebenen parasitischen Krebses zu seiner Verfügung gehabt hat. Jedoch wird die unzureichende Beschreibung durch eine Zeichnung ergänzt welche die Artmerkmale von *C. rubosus* deutlich ans Licht treten lässt.

Soweit man urteilen kan, stellen die Vertreter der Gattung *Cardiodectes* ziemlich seltene Formen dar, wenn sie auch verschiedenen Fischen und in verschiedenen, weit voneinander entfernten Gegenden auftreten. So ist *C. bellotti* als Parasit von *Scopelus benoiti* COCCO, *Sc. caudispinosus* JOHS und *Sc. glacialis* im Mittelmeer verbreitet. Der von WILSON beschriebene *C. medusaeus* ist für drei sehr weit voneinander entfernte Gegenden angegeben, namlich Kalifornien (Monterey Bay) — an *Nannobrachium leucopsarum*, Japan (Misaki) — an *Diaphanus glanduliferus* — und das Mittelmeer (Calvi) — an *Myctophum affine* (BRIAN, 1912). — *C. anchorellae* stammt aus der Umgegend von Madras, wo er an der Basis der Schwanzflosse der *Stolephorus tri* (*Pisces*) vorgefunden wurde. *C. rubosus* ist nur ein einziges Mal im Material der Siboga-Expedition angetroffen worden und zwar als Parasit einer *Apogon*-Art. Als Fundort wird Anchorage, Salomakie Island, angegeben, also eine dem Fundort des *C. hardenbergi* varhältnismassig nah gelegene Gegend.

Die Vertreter der von uns aufgestellten Spezies sind am *Stolephorus heterolobus* RÜPP. aus der Umgegend von Batavia vorgefunden worden. Wieweit sich die Verbreitungsgrenze von *C. hardenbergi* erstreckt, lässt sich selbstverständlich zurzeit nicht sagen. Vermutlich tritt er aber in denselben Bezirken wie *Stolephorus heterolobus* auf. Wenn dieser Fisch auch nicht den einzigen

Wirt des Parasiten darstellt, so scheint er jedenfalls sein Hauptwirt zu sein. *Stolephorus heterolobus* ist eine in der Gewässern des Indo-Australischen Archipels weit verbreitete Art. Ihr Vorkommen ist für viele Orte nachtgewiesen. Wie die übrigen Vertreter der Gattung zieht sie Küstengewässer und Estuargewässer vor. An diesen Stellen werden auch gewöhnlich die Fische gefangen. An der Küste von Java ist *St. heterolobus* ein gewöhnlicher Fisch und wird in grosser Menge in Laufe des ganzen Jahres gefangen (HARDENBERG, 1934, pg. 324 - 325).

Zum schluss ergreife ich die Gelegenheit um auch Herrn Prof. Dr. A. BRIAN und Prof. W. H. LEIGH-SHARPE auf dieser Stelle für die Zusendung Ihrer Arbeiten, die ich für meine Untersuchung benötigte, meinen innigsten Dank auszusprechen.

VERZEICHNIS DER ZITIERTEN LITERATUR.

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